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DECEMBER 1952 VOL. L, NO. 4

NOVELETTE

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Astounding SCIENCE FICTION published monthly by Street & Smith Publications, Incorporoted at 575 Madison Avenue, New York 22, New York. Gerald H. Smith, President; Ralph R. Whittoker, Jr., Executive Vice President; Arthur P. Lawler, Vice President and Secretary; Thomas H. Kaiser, Treasurer. Copyright, 1952, in U. S. A. ond Great Britain by Street & Smith Publicatians, Inc. Entered as Second Class matter at the Post Office, New York, N. Y. Subscriptions $3.50 for one year and $6.00 far two years in United Stotes ond Possessians; $4.50 for one year ond $7.75 for two years in Canada; $4.75 for one year ond $8.00 for two years in Pon American Union, Philippine Islands and Spain. Elsewhere $5.00 for one year ond $8.50 for two years. When possible ollow four weeks for change of oddress. Give old oddress and new address when notifying us. We cannot accept responsibility far unsalicited monuscripts or ort work. Any material submitted must include return postage. All subscriptions shauld be addressed to Subscription Dept., Street & Smith Publicotions, Incorporoted, 304 Eost 45th Street, New York 17, New York.

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EDITORIAL

QUESTION....

The mystics—who have long displayed a rather adolescent characteristic of having absolute convictions without soundly developed basis—have sometimes hit some perfect bull's-eyes. They've long held that the physical world is all illusion, for instance. You know, darned if they weren't right! "Solid" matter actually turns out to be just as illusory as they said. But the trouble with them was that their statements didn't make any sense at all; an idea is useful not just because it's true, but because you know *why* it's true.

The mystics have long maintained that Man had something separate, apart from, and different from that which animals have. They called it "soul"—but had no answer to what that was.

The scientist says "I don't know; someday I may find out whether that is valid or not. Until then, I have no statement to make." That is the only possible conclusion that can be based on true knowledge.

The attitude "Man is simply a more complex animal, different in degree but not in kind," is just as indefensible as the attitude of the mystic—and is, in fact, a mystical attitude itself. Such an attitude insists that the speaker "knows" this to be the case, without any proof of that "knowledge" whatsoever. Which is, of course, the attitude of pure mysticism.

Actually, the true scientist must recognize that under many circumstances a difference of degree does, in fact, produce a difference in kind when a certain critical level is reached. For example, one piece of anthracite will not burn in air; therefore a pile of anthracite must be non-burnable because that is just a more complex case of one-piece-won't-burn, isn't it?

And by measuring the radioactivity of a 0.1 gram sample of U-235, it might be calculated mathematically that it would be perfectly safe to stand fifteen feet from a seventy-five pound

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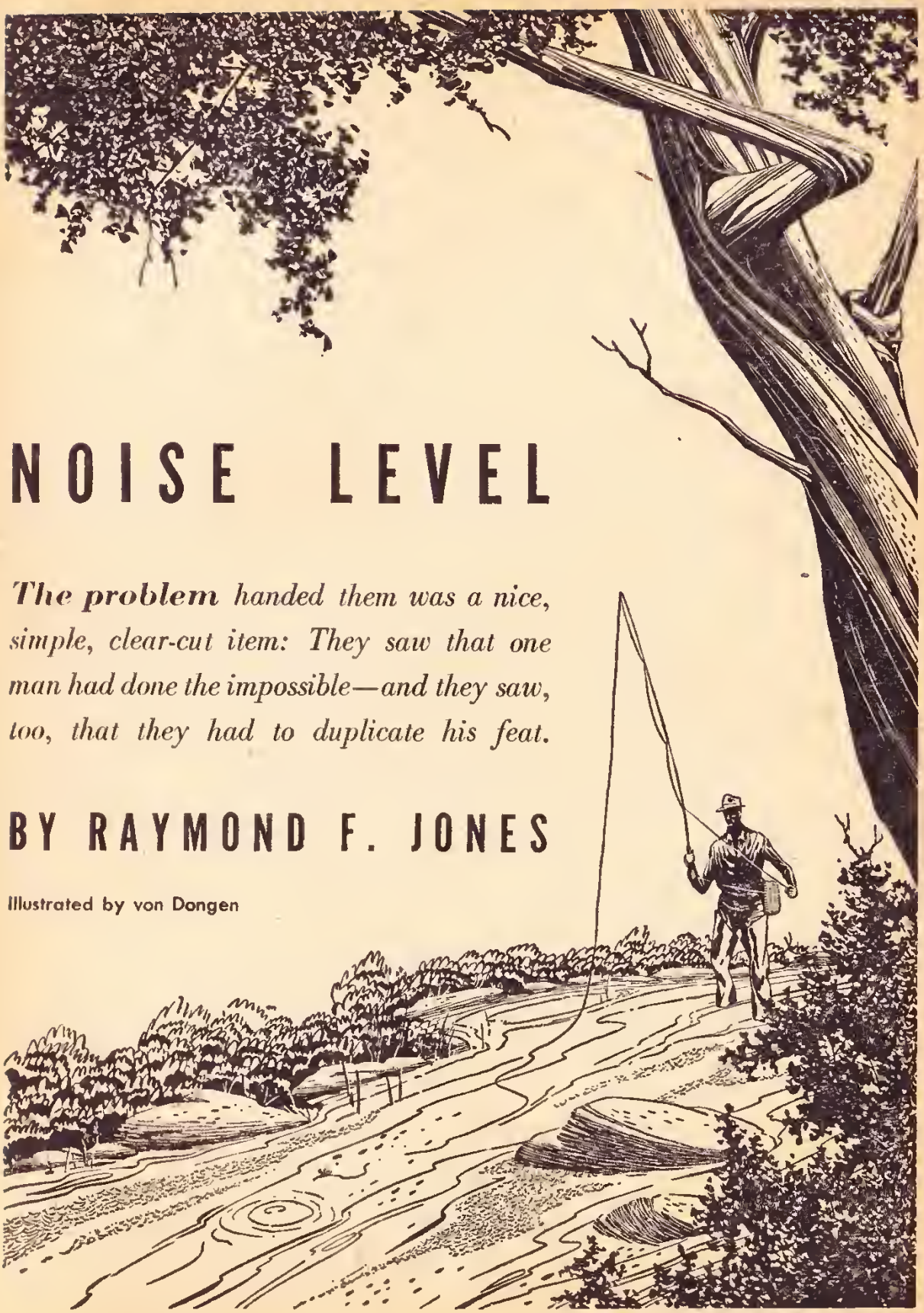


NOISE LEVEL

The problem handed them was a nice, simple, clear-cut item: They saw that one man had done the impossible—and they saw, too, that they had to duplicate his feat.

BY RAYMOND F. JONES

Illustrated by von Dongen

I.

Dr. Martin Nagle studied the paint on the ceiling of the outer anteroom of the Office of National Research. After ten minutes he was fairly certain which corner had been painted first, the direction of advance across the ceiling, and approximately how long it had taken.

It was a new building and a new paint job, but these facts were evident in the brush marks and brush hairs left in the paint. On the whole, the job was something of an indication of how things were in general, he thought somewhat sadly.

He studied the rug. Specifications should have been higher. The manufacturer undoubtedly operated on the principle of "don't throw away seconds; you can always sell them to the Government."

His watch showed twenty-five minutes spent in the study of the anteroom. It was all he was going to give it. He picked up his briefcase and top coat and moved toward the door.

He almost collided with a gray-suited figure, then backed away in pleasant recognition.

"Berk!"

The face of Dr. Kenneth Berkeley lighted as he gripped Martin Nagle's free hand and clapped him on the shoulder.

"What are you doing out here in this waiting room, Mart?"

"I got invited to some conference with all the top dogs and high brass, but the boys in blue wouldn't let me in. I was just on the way back to California. But you're one of the last I expected to meet here. What are you doing, Berk?"

"I work in ONR. I'm on this conference myself. They sent me out to look for you. Everybody else has arrived."

"I saw the parade from here. Dykstra of MIT, Collins of Harvard, and Mellon from Cal Tech. A high-powered bunch."

"It is. And they're all waiting on you! Come on. We'll talk later."

Mart jerked a thumb towards the office opening off the anteroom. "The boys in there seem to have doubts as to whether I can be trusted not to pass things on to the Comrades. I can't wait around. It'll probably take six weeks to clear me. I thought all that would have been taken care of. Evidently it wasn't. Give my regards to everybody, and tell Keyes I'm sorry I hadn't been cleared for classified projects. I guess he didn't know it."

"No, wait—this is absolutely silly," said Berk. "We've got to have you in there. Sit down and we'll have this thing cleared in five minutes!"

Mart sat down again. He had never worked on any classified projects. The fingerprinting and sleuthing into the past of his colleagues had always seemed distasteful to him. He knew Berk didn't have a chance now. He'd

seen more than one good man twiddle his thumbs for six months to a year while his dark past was unearthed.

Rising voices from the inner office of the FBI agent became audible. Mart caught snatches of Berk's baritone roar. "Utterly ridiculous . . . top drawer physicist . . . electro fields . . . got to have this man—"

After the FBI office there were still the offices of Military Intelligence and Naval Intelligence to hurdle. It was a fantastic triple barrier they had woven about this conference. On coming in he had chuckled at this further evidence of frantic bureaucrats to button up the secrets of nature which lay visible to the whole world.

In a moment Berk came striding out, red-faced and indignant. "You stay right there, Mart," he said furiously. "I'm going to get Keyes on this thing, and we'll find out who's got a right to get into this place besides the janitor!"

"Look, Berk—I don't mind. I don't think you ought to bother Keyes with this—"

"I'll be right back. This thing has gone too far."

Mart felt rather foolish. It was not his fault he couldn't get by the security officers, but that failure induced a faint sense of guilt.

Berk returned within minutes. With him were two men in uniform, a brigadier general, and a naval captain. With them was Dr. Keyes, Director of ONR. Martin knew him only by reputation—which was very top-drawer indeed. Keyes approached with a direct friendly smile and offered his hand.

"I'm very sorry, Dr. Nagle, regarding this delay. I had no idea that you would be stopped at the security desk. I issued instructions in plenty of time for the conference that everyone invited be properly cleared. Somehow this formality was overlooked in your case. But I am sure that we shall be able to make satisfactory emergency arrangements within a few moments. If you will wait here while I confer with all these gentlemen—"

They closed the door of the inner office, but Mart could not help straining his ears at the rumble of sounds that filtered through. He caught a phrase in a voice that belonged to one of the security officers: ". . . Demanded these triple security screens yourself—"

And another from Keyes: ". . . The one man who may be able to crack this thing for us—"

Mart had come reluctantly. His wife had protested, and the two children had set up a tremendous wail that it might mean no summer vacation at all.

He rather wished he had heeded their protests. The moment a man became involved in something so classified it required triple passes from the Army, Navy, and FBI and

he could say good-by to freedom. He wondered how Keyes had become involved in such a circuitous business. Keyes had done monumental work on electromagnetic radiation.

And he wondered, too, what Kenneth Berkeley was doing here. It was way out of his field. Berk was a top psychologist in the mechanics of learning, and experimental training procedures.

It looked to Mart as if both of them were wasting their time in security clearance wrangles.

He was not particularly intrigued by the possible magnitude of the problem under consideration. A man sitting by a mountain stream under an open summer sky had the most ponderous problems of nature before him if he chose to consider them. None couched in hush-hush terms behind closed lab doors could have any greater import.

At last the door opened. Mart arose. Dr. Keyes led the procession out of the room. All of the men were a little more strained in their expressions than when they went in, but Keyes took Mart's arm.

"It's all right. You have full clearance now. Your papers will be issued and ready when you come out. But let's get to the conference at once. We've kept the others waiting."

As Mart stepped inside the conference room he caught his breath involuntarily. Besides the brilliant array of his colleagues in fields closely allied to his own, there was a display of gold splashed uniforms of all military services. He had quick recognition of several lieutenant generals, vice admirals, and at least one member of the JCS.

Berk ushered him to a seat in the front row. He felt doubly guilty that these men had been kept waiting, although it was no direct fault of his.

At the front of the room a projection screen was unrolled on the wall. A sixteen mm. projector was set up near the rear. On a table on the far side a tarpaulin covered some kind of irregular object.

Keyes stepped to the front of the room and cleared his throat briefly.

"We will dispense with the formality of introducing each of you gentlemen. Many of you are acquainted, professionally or personally, and I trust that all will be before this project is many hours old.

"The top classification nature of the material we are about to discuss has been emphasized to you by the triple filter of security officers who have passed upon your admission to this room. That which is discussed here you will properly regard as worthy of protection with your own life, if such an extreme consideration should be forced upon you at some future time."

The military members of the audience remained immobile, but Martin Nagle observed an uneasy shifting

among his fellow scientists. All of them were to some degree uncomfortable in the presence of the military assumption that you could lock up the secrets of nature when they lay all about like shells upon the seashore.

But Keyes wasn't a military man. Mart felt his muscles become a little more rigid as the significance of this penetrated.

"Ten days ago," said Keyes very slowly, "we were approached by a young man, an inventor of sorts, who claimed to have produced a remarkable and revolutionary invention.

"His name was Leon Dunning. He had an unusual regard for his own abilities, and expected, apparently, that everyone else would have the same regard on sight. This trait led him to a rather unpleasant presentation of himself. He would talk with no one but the Director of the Office, and made such a nuisance that it became a question of seeing him or calling the police.

"His case was drawn to my attention, and I finally chose to see him. He had some rather startling claims. He claimed to have solved the problem of producing an antigravity machine."

Martin Nagle felt a sudden sinking sensation within him—and an impulse to laugh. For this he had canceled the kids' summer vacation! Maybe it wasn't too late to get back—

He glanced at his colleagues. Dykstra was bending over and rubbing his forehead to hide the smile that appeared on his lips. Lee and Norcross gave each other smiles of pitying indulgence. Berkeley, Mart noted, was almost the only scientist who did not move or smile. But, of course, Berk was a psychologist.

"I see that some of you gentlemen are amused," continued Keyes. "So was I. I wondered what was the best means of getting rid of this obnoxious crackpot who had forced his way into my office. Again, it was a question of listening until the ridiculousness of his claims became self-evident, or having him thrown out. I listened.

"I tried to draw him out regarding the theories upon which his device operated, but he refused to discuss this in detail. He insisted such discussion could be held only after a demonstration of his device.

"With a free Saturday afternoon that week, I agreed to watch. Dunning insisted that certain military personnel also be invited and that films and tape recording equipment be available. Having gone as far as I had, I agreed also to this and rounded up some of the gentlemen who are with us this afternoon.

"He wanted no other kind of publicity, and so we arranged to meet at the small private airfield at the Dover club. That was just one week ago today. He demonstrated.

"A small pack was attached to his shoulders by straps. I assisted him in putting it on. It weighed perhaps

thirty-five or forty pounds. It had no visible means of propulsion such as propeller or jets, and no connection to an external power source. Seeing it, I felt extremely ridiculous for having invited my military guests to such a futile performance.

"We stood in a circle about ten feet in diameter around him. When the pack was fastened, he gave us a kind of pitying smile, it seemed, and pressed a switch at his belt.

"Instantly, he rose straight up into the air in a smoothly accelerated climb. We spread apart to watch him. At about five hundred feet, he came to a stop and hung motionless for a moment. Then he dropped back down to the center of the circle."

Keyes paused. "I see a variety of expressions on your faces. I presume some of you consider us who observed it as victims of hallucinations or out and out liars. We agreed afterwards that it was very fortunate that Dunning insisted on motion pictures of the demonstration. These we have for your inspection. If you will, please—"

He signaled to his assistants. The shades were drawn and the projector at the rear started with a whirr. Mart found himself leaning forward, his hand clutching the desk arm of the chair. This was something he didn't even *want* to believe, he thought!

On the screen there appeared a scene of the encircling men. In the center, Dunning appeared to be in his late twenties. Mart could detect at once the type that Keyes had described—a snotty young jerk who knew he was good and figured others better catch on to that real fast. Mart knew the type. You run in to them in senior engineering classes in every school in the country.

He watched the circle back from Dunning. There was a clear shot of the alleged inventor standing with the weird pack on his back. He fumbled a moment with the key switch at his belt, then rose abruptly from the ground.

Mart stared. The picture panned up jerkily as the operator evidently retreated for a longer range view. He watched closely for any sign of emanation from the pack. He had to remind himself of the foolishness of looking for such. There was certainly no type of jet that could operate this way.

But antigravity—Mart caught a feeling that was a cross between a prickle and a chill moving slowly along the upper length of his spine.

The motion on the screen came to a halt. Then slowly Dunning lowered himself to the middle of the circle once more.

The screen went dark, and lights flashed on in the room. Mart jerked, as if waking from a hypnotic spell.

"We paused at this point," said Keyes. "Dunning became more talkative and discussed somewhat the basic theories of his machine. For this we used the tape recorder he had

insisted on bringing along.

"Unfortunately, the record is so poor due to high noise level and distortion that it is next to unintelligible, but we will play it for you in a moment.

"Following the discussion, he agreed to make another demonstration showing an additional factor, horizontal flight control. We'll have the movie of this, now."

He touched the light button. The scene appeared once more. This time the circle opened at one side and Dunning rose in a rather steep arc and leveled off. Against the background, he seemed about as high as the roof of the hangar beyond. For about a hundred feet he drifted slowly, then accelerated his pace. Mart felt a wholly irrational impulse to laugh. It was Buck Rogers in full attack.

Abruptly the screen flared. A puff of light exploded from the pack on Dunning's back. For a terrible moment he seemed suspended in an attitude of violent agony. Then he plunged like a dropped stone.

The camera lost him for an instant, but it caught the full impact of his body on the field. During the fall, he turned over. The pack was beneath him as he crashed. His body bounced and rolled a short way and lay still.

Keyes moved to the light switch, and signaled for the raising of the shades. Someone rose to do this. No one else moved. The room seemed caught in a suspension of time.

"There you have it, gentlemen," said Keyes in a quiet voice. "You will begin to understand why you were called here today. Dunning had it—antigravity. Of that we are absolutely sure. And Dunning is dead."

He drew a corner of the canvas from the table by the far wall. "The remains of the device are here for your examination. So far, we see only burned and bloody wreckage in it. Under your supervision it will be carefully photographed and dismantled."

He dropped the cover and returned to the center of the platform. "We went immediately to Dunning's house with a crew of investigators from ONR assisted by security officers of the services.

"Dunning's quite evident paranoia was carried out in an utter lack of notes. He must have lived in constant fear that his work would be stolen. His laboratory was excellent for a private worker. What his income was we don't know as yet.

"He also had an astonishing library —astonishing in that it covered not only the sciences, but almost every occult field as well. This, too, remains somewhat of a mystery.

"We investigated his college background. He appears to have had difficulty in getting along at any one college, and attended at least four. His curriculum was as varied as his library. He studied courses in electri-

cal engineering, comparative religion, advanced astronomy, Latin, the theory of groups, general semantics and advanced comparative anatomy.

"We managed to contact about twenty of his instructors and fellow students. Their uniform opinions describe him as paranoid. He was utterly without intimates of any kind. If he communicated his theories to anyone, we do not know about it.

"So the only record we have of the expressions of the man who first devised an antigravity machine is this poor quality tape."

He nodded again to the operator at the rear of the room. The latter turned on the recorder whose output was fed to a speaker on the table in front.

At once the room was filled with a hissing, roaring garble. The sound of planes taking off—the everyday noise of the airport. Beneath the racket was the dead man's voice, a thin, rather high-pitched sound carrying through the background noise a tone of condescension and impatient tolerance.

Mart listened with ears strained to make sense of the garble. His eyes caught Berk's and reflected his despair of ever getting anything out of the mess. Keyes signaled the operator.

"I see that you are impatient with this recording, gentlemen. Perhaps there is no purpose in playing it in this conference. But each of you will be given a copy. In the privacy of your own laboratories you will have opportunity to make what you can of it. It is worth your study simply because, as far as we know, it contains the only clues we possess."

Mart raised a hand impatiently. "Dr. Keyes, you and the others at the demonstration heard the original discussion. Can't you give us more than is on the tape?"

Keyes smiled rather bitterly. "I wish that we could, Dr. Nagle. Unfortunately, at the time it seemed that the semantic noise in Dunning's explanation was as high as the engineering noise on the tape. We have however, filled in to the best of our recollection on the written transcript, which we will give you.

"This transcript gives what has been pieced together by phonetic experts who have analyzed the tape. Observers' additions are in parentheses. These were added only if all observers agreed independently, and may or may not be accurate. Is there any other question?"

There were, they all knew, but for the moment the impact seemed to have stifled the response of the whole audience.

Keyes took a step forward. "I wonder if there is any one of you who underestimates the seriousness of this problem now. Is there anyone who does not understand that this secret must be regained at all cost?

"We know that within the field of

present knowledge there lies the knowledge necessary to conquer gravity—to take us beyond the Earth, to the stars, if we wish to go.

"We know that if one young American could do it, some young Russian could also. *We have to duplicate that work of Dunning's.*

"The full facilities of ONR are at your disposal. Access to Dunning's laboratory and library and the remains of his machine will be granted, of course. Each of you has been selected, out of all whom we might have called, because we believed you possess some special qualification for the task. You cannot fail.

"We will meet again this evening, gentlemen. I trust you understand now the necessity for absolute security on this project."

II.

A long time afterwards, Martin Nagle recalled that he must have been in a partial stupor when he left that conference room. He felt a vague and unpleasant sensation about his head as if it had been beaten repeatedly with a pillow.

He and Kenneth Berkeley went out together. They paused only long enough to make polite greetings to his fellow physicists whom he had not seen for a long time. But he was in a hurry to leave. To get rid of that feeling in his head.

In front of the ONR building he

stopped with his hands in his pockets and looked over the unpleasant gray of the city's buildings. He could close his eyes and still see a man rising straight up into the air—soaring at an angle—dropping like a plummet.

All at once he realized he hadn't even stopped to examine the remains of the instrument under the tarpaulin. He turned suddenly on Berkeley.

"The psychology of this thing—is that where you're in on it, Berk?"

His companion nodded. "Keyes called me in when he wanted an investigation into Dunning's past. I'm staying, I guess."

"You know it's impossible, don't you?" said Mart. "Utterly and completely impossible! There's nothing in our basic science to explain this thing, let alone duplicate it."

"Impossible? Meaning what?"

"Meaning that I've got to . . . that everyone of us has got to shift gears, back up, retrace who knows how far—twenty years of learning—five hundred years of science? Where did we go off the track? Why was it left to a screwball like Dunning to hit it right?"

"He was an odd character," mused Berk. "Astrology, mysticism, levitation. There's quite a bit in the tape about levitation. That's not so far removed from the concept of antigravity at that, is it?"

Mart made a rough noise in his throat. "I expect to hear any moment that his first successful flight was aboard a broomstick."

"Well, there's quite a bit of lore about broomsticks—also magic carpets and such. Makes you wonder how it all got started."

The shock was slow in wearing down. Martin returned to the hotel after the evening conference, which was spent mostly in examination of the wreckage.

It was as Keyes had said, hopeless. But there was an indefinable something about gazing upon the remains of what had been the realization of an impossible dream. Mart felt a kind of frantic yearning to reach out and touch that mass and convert it back to the instrument it had once been by sheer force of will. As if believing it possible would make it so.

And wasn't there some essence of truth in this, he thought? Dunning had believed it could be done and had done it. Reputable men in science didn't believe such things possible—

Now, in his hotel room, Mart sat on the edge of the bed looking out the window and across the night lights of the city. There were certain things you had to accept as impossible. The foundation of science was built upon the concept of the impossible as well as the possible.

Perpetual motion.

The alchemist's dream—as the alchemist dreamed it, anyway.

Antigravity—

All man's experience in attempting

to master nature showed these things could not be done. You had to set yourself some limitations. You had to let your work be bounded by certain Great Impossibles or you could spend a lifetime trying to solve the secret of invisibility or of walking through a brick wall.

Or trying to build a magic carpet.

He stood up and walked to the window. There had been growing all afternoon a sense of faint panic. And now he identified it. Where could you draw the line? It had to be drawn. He was sure of that.

It had been drawn once before, quite definitely. In the 1890s they had closed the books. Great minds believed then that science had encompassed the universe. All that was not known belonged to the Great Impossibles.

Then had come radium, the Roentgen tube, relativity, cosmic rays.

The line vanished. Where was it now? A few hours ago he would have said he could define it with fair accuracy. Tonight he did not know.

He went to bed. After an hour he got up and called Kenneth Berkeley. The clock said almost midnight. It didn't matter.

"Berk," he said into the phone. "Mart. I've just been thinking. The whole crowd will be going through Dunning's lab and his library. What's the chance of you getting me out there first thing in the morning? Just the two of us. I'd like to beat the crowd."

"I think I can arrange it," said Berk. "Keyes wants each of you to work as you wish. I'll tell you more about that tomorrow. I'll call you as early as I can."

It rained during the night, and when Berk called for Mart in his car, the city was dismal with fog, lessening even further the reality surrounding them.

"Keyes wasn't much in favor of this," said Berk as they drove away from the hotel. "It's liable to make some of the others mad, but frankly, I'm sure he's convinced that you're the member of the class most likely to succeed."

Mart grunted. "Least likely, I'd say. I'm not sure that I'm convinced yet that Dunning didn't have some terrific joker in here somewhere."

"I know what you mean, but you will. It comes gradually. And easier for you. You're the youngest of the group. Keyes thinks some of the older men may spend all their time proving Dunning couldn't do it. How do you feel about that? Is that the way you're heading, or are you going to try to find out what Dunning did?"

"Anything a jerk like Dunning can do, Nagle can do double—once Nagle is convinced that Dunning did it."

Berk threw back his head and laughed. "Keyes will love you, boy. He's been afraid he wouldn't find a single top John in the country who

would really try."

Dunning's place was in the shabby, once fashionable sector of town where the owners of the gingerbread monsters were no longer able to meet the upkeep or sell them to anyone who was.

It had been learned that the house actually belonged to an uncle of Dunning, but so far he had not been located.

A guard was on duty at the front entrance. He nodded as Berk and Mart showed their passes.

"Dunning's laboratories and shops are on the first floor," said Berk. "Upstairs, is his library. He slept in one of the third floor bedrooms, but the rest are vacant. A lot of cooking seemed to have been done in the back kitchen. He left a well stocked larder. Where do you want to start?"

"A quick look through the labs to begin. I want to get the feel of the layout."

On the right of the entrance hallway, they came into a small but extremely well equipped chemistry laboratory. The place seemed well used, but immaculate. A complex fractionating setup was on the worktable.

"Almost the only piece of writing in the whole place was found on a small pad here," said Berk. "A bit of scratch work computation without any formulas or reactions."

Mart grunted and moved on to the adjacent room. Here was the more familiar hodgepodge of the electronic experimenter, but even in this there was instantly apparent the mark of a careful workman. Breadboard layouts were assembled with optimum care. Test leads were carefully made of rubber covered or shielded wire and equipped with clips instead of being the usual random lengths of colored connecting wire hastily stripped and tied to a terminal.

A sizable bank of rack and panel mounted equipment was not recognizable at once as to function. It appeared to be a setup that might belong to any careful experimenter who had no regard for his bank account.

This would need further study, but Mart continued moving through to the next room, a machine shop, as well equipped for its functions as the previous rooms. A six-inch lathe, a large drill press, and a milling machine were the chief items.

Mart whistled softly as he stood in the middle of the room and looked back the way they had come.

"When I was a kid in high school," he said, "this is exactly the kind of a place I thought Heaven would be."

"And it had to belong to a person like Dunning, eh?" said Berk with a slow smile.

Mart turned sharply. His voice became low and serious. "Berk—whatever Dunning may have been, he was no jug-head. A paranoid, maybe, but not a jug-head. He could do things. Look at this."

He picked up a weird looking assembly from a nearby table and held it up in the light. It gleamed with a creamy sheen. A silver plated bit of high frequency plumbing.

"That's beautiful," said Mart. "There're not more than three or four university shops in the whole country that can turn out a piece like that. I've had to fight for weeks to get our machinists to come up with anything that complex and then it would be way out of tolerance."

He hefted the piece of plumbing lightly. He knew it was just right. It had the feel of being made right.

Berk led the way across the hall. He opened the door for Mart. There, against the walls of the room, were panels of a compact digital computer, and on the other side an analogue computer.

"But you haven't seen anything yet," said Berk. "The surprise of your life is upstairs."

Gravity was a force, Mart thought as he climbed the stairs. You only lick force with force—in the world of physics, at least. In politics and human relations, force might yield to something more subtle, but if Dunning had licked gravity it was with some other—and presently known—force. Physics was at least aware of every force that existed. There were no gaps except perhaps the one temporarily occupied by the elusive neutrino.

Dunning's machine was ingenious. But it could be nothing but a clever application of well known laws and forces. There was no miracle, no magic in it. Having decided this on a slow, verbal basis, Mart felt somewhat more at ease. He followed Berk into the library.

There was not simply one room of it, but an entire suite had been converted and shelved. There were certainly several thousand volumes in the place.

"This is the one that may interest you most." Berk stepped into the nearest room on his left. "A is for Astrology," he said. He gestured toward a full section of shelving.

Mart scanned the titles: "Astrology for the Novice," "Astrology and the Infinite Destiny," "The Babylonian Way," "The Course of the Stars."

He hopefully pulled the latter volume from the shelf against the possibility it might be an astronomy text. It wasn't. He quickly put it back with its fellows.

"Well read, too," said Berk. "We examined quite a number and they have copious notations in Dunning's handwriting. This may be the one place we can find real clues to his thinking—in such marginal notes."

Mart waved a hand in violent rejection of the somber volumes and shoved his hands deep in his pockets. "Junk!" he muttered. "This has no bearing on Keyes' problem at all, of course. But it certainly ought to be a problem of interest to you.

"A guy would need two separate heads to hold an interest in the things downstairs and in this nonsense at the same time."

"But Dunning had only a single head," said Berk quietly. "Maybe it's all part of a whole that we don't see—and that Dunning did."

Mart pursed his lips and looked at the psychologist.

"I'm serious," said Berk. "My field is primarily the human mind, and only secondarily the subjects with which the mind deals. But we see in Dunning a single mind that can whip the matter of antigravity, that can hold an interest in the fields represented by the laboratories below, and can digest the material of this library.

"Now, actually, there is no true schizophrenia. In the skull of each of us is only a single individual, and anyone examined closely enough can be found to have a remarkably consistent goal, no matter how apparently erratic his activities.

"Perhaps much of the material Dunning found in both the library and in the laboratory proved redundant, but I would say that Dunning's genius apparently lay in his ability to extract relevant material from the redundant without catagorically rejecting entire areas of human thought."

Mart smiled tolerantly and turned away. He found himself facing a section of shelves covered with works on East Indian Philosophy. Six or eight feet of space was devoted to the subject of Levitation. Mart jabbed a finger at the titles.

"Anything those boys can do by hocus-pocus Nagle can do twice as fast by x's and y's and by making electrons jump through hoops."

"That's all Keyes wants. How soon can you deliver?"

III.

After lunch, they returned to ONR. Mart was assigned an office and given a copy of the Dunning tape. He put aside the prepared transcript, as Keyes had suggested, and prepared to listen, unbiased.

He turned on the recorder and winced at the garble of sound that blared forth again. With one hand on the volume control he rested his chin on his arm in front of the speaker and strained to hear through the noise the scarcely audible voice of Dunning.

Near the beginning, he caught the word "levitation" mentioned many times. There was a full phrase, "levitation which was first successfully demonstrated to the Western world by the English medium—." The buzz of a plane cut off the rest of it.

Mart rewound the tape and listened to that much of it again. At each mention of levitation an image flared up in Mart's mind. An image of a dirty, scrawny Indian fakir equipped with a filthy turban, a coil of rope

over one arm, and a basket with a snake in the other hand.

But Dunning had produced anti-gravity.

What semantic significance had *he* found in the word?

Mart growled to himself in irritation and let the tape run on. There was nothing more in those first few feet of it. He perked up his ears at a phrase "earth effect" separated by a garble from "distribution of sunspots unexplained to date by astronomers, and politely ignored by all experts—."

It struck a faint bell of recollection in Mart's mind. He scratched a note on a pad to check on it.

The sound dissolved again to hissing and roaring, through which the dead man seemed to taunt him. He gathered that much talk was on the subject of "planetary configurations—." Astrology. He groaned aloud and closed his eyes through a comparatively long stretch of audibility: "Magnetic storms on Earth predictable through movements of the planets in terms of quadrature—fields of data observed through thousands of years and do not fit explanations now accepted for other phenomena."

It shifted apparently, after many minutes, to comparative religion. "Galileo and Newton," Dunning said, "affected man's thinking more than they knew. They clipped from religion its miracles and from physics its imagination . . . of India there's more conquest of the physical universe than in a score of American research laboratories."

And that was the last of it. The tape fizzled out in a long garble of buzzing planes and faulty recording. Mart turned off the machine.

That was it. The mind and work of the first man to directly conquer gravity!

With an almost physical weariness he turned to the transcript and scanned through it. There was more, but it was astonishing how little additional information was actually added from the memories of the original observers. Mart supposed Dunning's words were such a shock to those military and scientific minds that they were stunned into semi-permament amnesia in respect to the things he said.

He leaned back in the chair, summing up what he had heard. Dunning's thesis seemed to be that much sound data had been excluded by conventional scientists from standard theories. The dead man had believed much of this data could be found and explained in the various realms of astrology, East Indian mysticism, movements of sunspots, the levitation of mediums, and a host of other unorthodox areas.

Where was the thread of rational thought that could find its way through this? He closed his eyes again, trying to feel for a starting point.

There came a knock on the door, and a voice. "May I come in, Dr.

Nagle?"

It was Keyes. Mart rose and offered a chair. "I have just finished the tapes and transcription. There is very little to go on."

"Very little indeed," said Keyes. "When you were a youngster entering a contest for the first time you had a feeling for it. You know what I mean. It's in your throat and chest, and in your stomach. It goes all the way through your legs to your toes.

"It's the feeling of your entire organism—a feeling that you haven't got a chance to win—or that you are going to aquit yourself to the maximum ability within you, regardless of the strength of others. Do you understand me?"

Mart nodded.

"What kind of a feeling do you have about this, Dr. Nagle?"

Mart relaxed and leaned back with his eyes half closed. He understood Keyes. He had gone through the range of all possible feelings since yesterday afternoon. Which one of them had remained with him?

"I can do it," he said quietly to Keyes. "I could wish for more data, and I'm not wholly in sympathy with Dunning's approach. But I can examine the data he had, and re-examine the data I have. And I can do it."

"Good!" Keyes stood up. "That's what I came in to find out. And your answer is what I hoped to hear. You may expect that your reaction is not quite universal among your colleagues, although I feel all will co-operate. But some of them will be licked before they start, because they will feel, and persist in feeling that the thing ought not to be."

Dr. Kenneth Berkeley had never ceased to wonder at the constitution of man. When he was very young he had wondered why some of his fellows believed in fairies, and others did not. He wondered why some could believe the moon was made of green cheese, and others were equally sure it could not be so.

He grew to wonder intensely just how man knew anything for sure, and that long road of wonder led to the present moment of his status as fellow in psychology at ONR.

He was grateful for the privilege of being on this project under the leadership of Dr. Keyes. Keyes appreciated more than any other physicist that he had known the importance of the fact that an individual is a man first and a scientist second—that there is no true objectivity in science. There is no divorcing the observer from the observed, and every scientific theory and law, no matter how conscientiously propounded and objectively proved is nevertheless colored by the observer.

Berkeley was intrigued by the study of the physicists' reactions to the situation in which Dunning's discovery and death had placed them.

Martin Nagle had reacted approxi-

mately as Berkeley expected. They had known each other well during undergraduate days in college, drifting apart later as their professions diverged.

Through the day Berkeley conducted the rest of the scientists through the house. A number of them had made requests to go privately as Mart had done. Others went in groups of three or four. But by the end of the day all had visited the place except Professor Wilson Dykstra.

During the first day, Dykstra confined himself to a study of the tape and transcription. He did not present himself for a visit to the Dunning house until the following morning.

Berk called at his hotel. He kept the psychologist waiting fifteen minutes before he finally appeared through the revolving doors.

Dykstra was a small, round man in his late sixties, owlish in heavy framed glasses. His jutting lower lip seemed to signify his being perpetually on the defensive, as if he couldn't believe the world were really as he saw it. But Berk knew he was a great man in his own field. He had contributed much to the elucidation of Einstein's work in relation to gravity, which was the reason for his being invited to participate in the project.

The sky was threatening, and Dykstra clutched a black umbrella to his chest as he emerged from the hotel. Berk waited with the car door open.

"Good morning, Dr. Dykstra. It looks as if we'll be alone this morning. Everyone else took a visit to Dunning's yesterday."

Dykstra grunted and got in. "That's the way I wanted it. I spent a full day yesterday going over that ridiculous tape recording."

Berk moved the car out into the line of traffic. He had rather felt from the very first that the project could get along just as well without Dykstra.

"Were you able to derive anything at all from it?"

"I have reached no conclusion as yet, Dr. Berkeley. But when I do, I do not believe it is going to be that young Dunning was the unadulterated genius some of you people consider him. Surely you, a psychologist, can understand the type of mind that would produce such a mixture of unrelated and irrelevant, not to say mythological material!"

"There are many strange things about the human mind, which we do not know," said Berk. "One of the least understood is the point at which genius ends and nonsense begins."

"In physics the march is steadily upward! We have no doubt as to which way lies progress."

Berk let that one ride. A man who saw in the world such terrible simplicity might ultimately find Dunning's mystery completely transparent. He couldn't risk that possibility by arguing.

They drew up to the old mansion Dunning had occupied. Dykstra surveyed it from the car. "The kind of a place you would expect," he grunted.

It was difficult to estimate what was going on in the physicist's mind as he came into the laboratories.

In the first room he scanned the shelves of reagents. He took down a dozen bottles and examined their labels closely. Of some he removed the stoppers and sniffed cautiously, then replaced them all on the shelf in mild disdain.

He spent a long time examining the fractionating setup in the center of the room. He spotted the pad of computations left there and drew an old envelope from his pocket and did some comparison scribbling.

In the electronics room he turned to look through the doorway. "Why would any man want two such laboratories as these?"

His inspection was much more thorough than that of any of the others, including Martin Nagle. Berk supposed that Mart and many of the others would be back, but Dykstra was going through with a fine toothed comb the first time.

He poked through the machine shop. "Well equipped," he muttered, "for a man who likes to tinker."

But he was highly impressed by the computer room. He examined the settings of the instruments and the chart papers. He opened every desk drawer and shuffled through the scattering of papers inside.

Red-faced, he turned to Berk. "This is absurd! Certainly there would be charts, papers, or something showing the man's calculations. These instruments are not here for show; they've obviously been used. Someone has removed the computational material from this room!"

"It's just as we found it," said Berk. "We don't understand it any better than you."

"I don't believe it," said Dykstra flatly.

The reaction of the physicist to the library was the thing Berk was most interested in. He let Dykstra look at will over the strange and exotic collection of volumes.

At first Dykstra reacted like a suddenly caged animal. He ran from the shelves of mythology, got a glance at the section on astrology, hurried from there to the books on faith-healing, and made a spiral turn that brought him up against the region of material on East Indian philosophy.

"What is this," he bellowed hoarsely, "a joke?"

The pudgy figure seemed to swell visibly with indignation.

"The next room would interest you most, perhaps," said Berk.

Dykstra almost ran through the adjoining door as if escaping some devil with whom he had come face to face. Then, catching sight of the titles here, he began to breath easily and with an audible sighing of relief. He was among friends.

With an air of reverence, he took down a worn copy of Weyl's "Space Time Matter," and a reissue of the relativity papers.

"It isn't possible," he murmured, "that Dunning owned and understood both of these libraries."

"He understood and conquered gravity," said Berk. "And this is the place in which he did it. This is the last of the clues we have to show you."

Dykstra put the books carefully back on the shelves. "I don't like it." He glanced back to the other room as if it were a place of terror.

"There's something wrong," he murmured. "Antigravity! Whoever heard of such a thing? And how could it come out of a place like this?"

IV.

That afternoon, they met again in conference. There was agreement that they would tackle the problem. Only Professor Dykstra exhibited a continuing belligerence toward the affair, yet he made no move to withdraw.

Full co-operation of military facilities were pledged by the representatives of the services. The center of investigation was to be at ONR, however, with branching research

wherever needed.

No one had conceived even a tentative starting point which he cared to discuss with his colleagues. Most of them had spent the morning re-reading the relativity papers and staring at the ceiling of their respective offices. They agreed to work as loosely or as closely as the problem demanded. Until some working program could be initiated by some of them, it was decided to hold daily seminars to try to spark each other into creative thought.

A minor honor came to Mart in his election as chairman of the seminar. It gave him uneasiness because he was junior in age and profession to all of them. But his eminence in electro-fields made him a likely coordinator of the project.

Mart selected a representative sample from the occult section of Dunning's library and took it to his own office. He settled down amid an aura of astrology, spiritualism, mysticism, religion, sunspot data, and levitation. He had no specific purpose, only to expose his own mind to the atmosphere in which Dunning had operated. Dunning had found the goal. The tracks he walked in had to be located, no matter where they were picked up.

Some of the stuff was boring, much could be nothing but sheer delusion. Yet his dogged pursuit left him intrigued by some of the material.

The reports on poltergeism at Leander Castle near London, for example. They were well reported. Independent cross references verified each other very well. The works on levitation were far more difficult to credit. There was a hodgepodge about purification of the body and the soul, of reaching assorted states of exaltation above the ordinary degree of mortal.

Yet levitation had occurred, according to reports of witnesses who might not be considered too unreliable.

And what did this have to do with religion—in which Dunning had had tremendous interest, to judge by the notations he made?

There were miracles in religion, Mart reflected.

Antigravity was a miracle.

Miracle: that which is considered impossible and which cannot be duplicated by the observers, even after it has been seen.

In scientific law there is a difference. It can be applied by anyone with sufficient IQ. But the worker of miracles does not come out of the laboratory or halls of learning.

He rises spontaneously out of the mountains or out of the wilderness, and gathers novices who seek with all their hearts to equal the Master. But they never do. Always there is a difference. The magic of miracles seems unteachable. It has its own spontaneous majesty, or is nothing but old-fashioned hoodwinking. There

seemed, to Mart, no in-between.

Antigravity.

Was it natural law, or miracle? Had Dunning found the bridge that made only a single category of the two? Or was he a performer of miracles, whose art could not be taught, but would arise spontaneously, full blown?

Mart slammed the books shut and pushed them to the rear of the desk. He pulled a scratch pad out of the drawer and began penciling furiously the basic Einstein equations.

By the end of the first week there was little to report. The daily seminars had been held, but outside of re-educating each other in the exotic concepts of the relativity world they had achieved nothing.

Or so it seemed to Mart. Keyes seemed quite pleased, however, and Berk mentioned that they should be congratulated on their progress. As if they had taken a major step forward in merely meeting and agreeing to undertake the project.

And maybe they had, Mart thought.

He found himself in difficulty as chairman of the seminar. Invariably, in such a group there is a member who undertakes to educate his colleagues anew in all the basic sciences. In this case, it was made doubly difficult because the self-appointed instructor was Professor Dykstra.

That he was capable of teaching them a good deal, there was no question. But on the Saturday at the end of this first week he arose with a particularly triumphant expression and strode to the blackboard where he began scrawling his barely legible chicken marks.

"I have achieved the thing for which I have been looking, gentlemen," he said. "I am able to show that no such instrument as we have had described to us is possible without a violation of Dr. Einstein's postulate of equivalence. If we admit the correctness of this postulate—as we all do, of course—then you will see from Equation One that—"

Mart stared at—and through—the equations that Dykstra had scrawled. He listened with half an ear. It looked and sounded all right. But something had to be done about Dykstra.

Dykstra was wrong—even with his equations being right. Where was it, thought Mart. It was something you couldn't name or scarcely define. Maybe it was in the *feeling* that Keyes talked about, the feeling that goes all through you down to your toes. He knew what Dykstra's feeling was, all right. It touched him like the proximity of a thousand-ton refrigeration unit going full blast. Dykstra thought they were fools to be monkeying with this project, and remained with it only because he considered it his solemn duty to show them this irrefutable fact.

He was dragging the feet of the whole group. But in spite of him, all

the rest were pulling in the other direction, Mart knew. In this week, they had all achieved an acceptance of the validity of Dunning's accomplishment. And that, after all, *was* something of an achievement, he decided.

In Mart's vision, the equations on the board became surrounded by fuzzy signs of the Zodiac. Dykstra had completed his argument and Mart stood up.

"Since you have presented us with such elegant proof of your thesis, doctor," he said, "and since we have all become aware of the reality of Dunning's accomplishment, the only conclusion we can make is that the basic premise is at fault. I would say you have submitted very excellent reasons for doubting the validity of the postulate of equivalence!"

Dykstra stood a moment as if he could not believe his ears. He turned to his seat indecisively as if trying to make up his mind to ignore or answer the statement. Finally, he grew red and his body seemed to swell as he faced Mart.

"My dear Dr. Nagle, if there is anyone in this room who does not understand that the postulate of equivalence has been established beyond any possibility of refutation I would suggest that he resign from this project immediately!"

Mart restrained a grin, but warmed to his subject. He had no purpose but to needle Dykstra, and yet—

"Seriously, doctor—and I throw this out to all of you: What would happen if the postulate of equivalence were not true?

"You've been as shocked as I by the items from Dunning's library, but I would like to ask: What is the significance of the postulate of equivalence in the accomplishment of the medium who is able to rise unsupported from a couch, in what is certainly a well authenticated instance of levitation?

"Why is the literature of the East so full of material on levitation? I think Dunning asked that question and got some sensible answers. If the postulate of equivalence doesn't fit those answers, perhaps we had better re-examine the postulate. As a matter of fact, if we ever expect to duplicate Dunning's work, we will have to examine every postulate we've got that pertains in any way to gravity."

Professor Dykstra abandoned what he considered had become a disorderly argument. He resumed his seat with a grandiose appeal to the equations on the board.

Unexpectedly, Jennings, a thin dry man from Cal Tech took the floor.

"I agree wholeheartedly with Dr. Nagle," he said. "Something has been happening to me this past week. I see it in most of you, also, whether you are aware of it or not.

"By the age of forty the average research physicist seems to acquire an

intuitive ability to fend off anything that doesn't jibe with the Laws as he knows them.

"Then we become heads of departments while the younger fellows come along and assimilate the data that didn't fit in our generation, and get credited with the discoveries we have passed over.

"We seem to establish a sort of gateway in our minds, floodgates if you will, through which the mass of physical universe data flows. As we become older and more learned we adjust the setting of this gate to the point where nothing new can be trapped behind it. We cling to that which we had in our youth and abruptly we are creatures of history.

"I feel the experiences of the past week have jarred my mental floodgates on their very hinges. Once more, I feel able to accept and retain data which I have not encountered before. I think Dr. Nagle is right. We have to re-examine all we have learned to this point concerning gravity. If any factors of East Indian lore or spiritualism prove relevant, I do not think Physics will be shattered to its foundations if we assimilate such data.

"We cannot escape the fact that one man solved antigravity. Eight days ago not one of us would have admitted the possibility. Today we are charged with the responsibility of moving forward in time and catching up with it."

Mart was tired after that seminar. It became a stormy affair. There seemed a kind of anger submerged not far below the surface of each of them. An anger at themselves for having been on the wrong track for so long, a kind of diffused rage at the whole physical universe for playing such tricks when asked a straightforward question.

More than one had balked at Mart's drastic suggestion. Sanders had said, ". . . and there can be no revision of the postulate of equivalence. Any data which indicates it automatically leaves the observer of that data suspect."

Mart called Kenneth Berkeley's office as soon as the seminar was ended.

"Hi, Berk," he said.

"Yeah—how's it coming? I've been wanting to get over your way the last couple of days. I haven't noticed any of you boys moving out into the machine shops yet. I suppose you are still in the paper-work stage."

"We haven't got *there*, yet," muttered Mart. "I have more important things than antigravity to discuss with you. How are you set up for a couple of days' fishing?"

"Fishing? I could probably make it. All work and no play and that sort of thing—I don't need to remind you, of course, of the need for top speed on this Project Levitation—"

"I'm going fishing," said Mart. "You coming along or not?"

"I'm coming. I can get the loan of a cabin on the best trout stream the other side of Fulton's Fish Market. When will you be ready?"

"I'll have to rent some gear. If you know a good place, I can be ready in an hour and we can pick it up on the way."

"I'll have to check my own gear, provided Judith hasn't thrown it out in the last three years since I used it. It's about a two hundred mile drive. We can make it by midnight."

Mart and Berk had done a good deal of fishing together one summer following their Junior year. They had spent much of that year and all of the summer settling the abstruse problems of the Universe with quite divergent results.

At the end of the summer Mart had been of the total conviction that life was wholly soluble in terms of the external world. If a man had something good and useful to do in shaping the world to his own dream, he would be a sane and happy man.

Berk had arrived at the opposite pole in the conviction that man's life lay within the thin shelter of his own skin. Now each of them had moved a good way towards the other's camp.

Mart thought of this as they drove through the night. He reminded Berk of it.

"If the world were as college Juniors see it, all our troubles would be over," said Berk. "There is probably no time in a man's life when he is so completely of a single minded point of view."

"I don't know. There's Dykstra. He hasn't changed an opinion since he was a Junior. He's going to prove Dunning didn't have antigravity or bust. He knows it can't be done."

"How about the others?"

"This week has been a period of metamorphosis. They've changed. We're where we can do some work, now."

There was a caretaker on the property Berk had borrowed. He had things ready when the two men arrived. Mart determined to put everything connected with ONR out of his mind while he was there. He sat down and wrote a letter home, which helped in that direction.

In the morning he arose in the clear mountain air, and to the enormous song of birds in the pines beyond the house, and he felt that he had truly forgotten all else but this. The smell of bacon and eggs floated in from the kitchen as he met Berk outside the door.

"It's nice to know a psychologist who knows a millionaire. Could we have had breakfast in bed if we had ordered it?"

Berk laughed. "Not on your life. Wait till Joe gets you out in the woods. Then you'll see how much coddling you'll get."

"Let's not take him along," said Mart. "I'd like to be alone as much

as possible."

"Sure. Joe won't mind. He's the one who knows all the good fishing holes, though—"

"The fish don't matter," said Mart.

The forest was moist with dew, and the pre-dawn chill remained in the ravines through which they descended towards the river. It was still shadowed by the mountains here, and quiet except for the few birds who had not abandoned its gray light for the pink tipped hills above.

Mart knew at once that this was what he needed. He donned the hip boots and tested the spring of the new glass rod he had rented.

"I guess I'm old-fashioned," he said. "I like the feel of the old ones better."

"I'm still using mine," said Berk. "Matter of fact, I believe it's the same one I had the last summer we were together."

They sloshed out into the water a little way above a quiet pool. It wasn't wide enough for both of them there, so Mart moved along upstream. "Some guy published an article the other day," he said, "in which he claimed the average time of catching a fish in a stream like this is two hours and nineteen minutes. Didn't we do better than that?"

"Seems like we did a lot better. If we don't, we'll have to get Joe to make a lunch today."

They did considerably better. By noon, Mart had six and Berk had seven good trout.

"I'll write the fish researcher a letter," said Mart, "and your family will eat trout for a week."

After lunch they sat with their backs against a tree on the bank and watched the water flowing past.

"Have you got any attack on the project at all?" said Berk.

Mart told him about the last seminar. "Dykstra may be entirely right. His math makes a pretty picture. But I was serious when I suggested the re-examination of the postulate of equivalence—at least as it now stands."

"You're ahead of me," said Berk. "What is the postulate of equivalence?"

"It was proposed by Einstein in one of his first papers, the 1907 one, I think. He postulated that the effects of inertia are equivalent to those of gravity.

"That is, in an object propelled at a constant rate of acceleration, a man would feel effects that could not be distinguished from those of gravity. He could walk, function, and would have weight just as if he were on a large mass having gravitational attraction.

"Conversely, an observer inside a freely falling elevator in Earth's gravitational field would observe no effects of gravity inside that elevator. He could stand on a scale, and would register no weight. Liquid would not

pour from a glass. It has been stated that no mechanical experiment could ever reveal the presence of Earth's gravitational field in the interior of any such frame of reference moving freely in this field of gravitation. We have accepted this assumption for a long time.

"There are good reasons for accepting it, good, sound mathematical reasons. Yet we have not empirically exhausted all possible means of detecting a gravitational field under such conditions, and it is foolish to exclude the possibility.

"So—Dykstra has made a good point in his fairly rigorous demonstration that a mechanism such as Dunning's would demand the abandonment of the postulate of equivalence. It may well be that the postulate is an unwarranted assumption, based upon inadequate data. If so, that's a good starting point. What the next step might be, I don't know."

"Is gravity a kind of a something that can be identified otherwise than as a mathematical symbol—or through the observation of a falling apple?"

"No. That's all it is, actually. A symbol in our formulas that stands for an unidentified something which manifests itself in the attraction between masses."

"How about a flowing something, like this stream?"

"Could be. Nobody knows."

The water eddied about a projecting rock near the bank. Berk threw in a handful of sticks he had been idly breaking in his hand. Swiftly, they flowed together and converged in the center of the whirlpool by the rock.

"Might be a point of view," he said, "in which it could be postulated that those sticks gravitated toward each other under a mutual attraction."

"It wasn't attraction in them," said Mart thoughtfully. "It was forces pushing and pulling on them. Gravity—a pushing and pulling, maybe. But a pull or a push of what? That Dunning! He knew!"

Sitting on the porch in the dark, after dinner, Mart had a feeling of satisfaction, a vague sense of having accomplished something during the day. He didn't know what, but it didn't matter. It was something—

"You know," he said suddenly, "the thing we need to know, and that you psychologists ought to be able to tell us is where ideas come from.

"Take the first cave man with two brain cells big enough to click together. Where did he get the idea to put a fire in his cave? I think that's the problem you and I tried to solve a long time ago. Where do they come from—inside or outside?" He paused and gave the mosquitoes his attention.

"Keep going," said Berk.

"I haven't any further to go. I'm thinking about gravity again."

"What are you thinking?"

"How to get a new idea concerning

it. What does a man actually do when he cooks up a new theory, a new mechanism? I feel like I'm being sucked into *that* problem constantly, instead of the one I'm supposed to be attacking."

"Well, what are you doing? You're trying to cook up a new idea—"

"I'm thinking right now about this afternoon. Something flowing—but it would be something you couldn't get a picture of—like space-time. Now that it's been brought into the open, I think I really have never liked the postulate of equivalence. Just a feeling knocking around through a few molecules in my cranium. The postulate is wrong.

"Then I try to picture something flowing through the dark of space. It couldn't be a three-dimensional flow like a river."

He sat up straighter and slowly withdrew the cigar from his mouth. "It couldn't be— But it *could* be a flow— He stood up suddenly and turned towards the house. "Look, Berk, you've got to excuse me, if you don't mind. I've got some math to do."

Berk's cigar tip brightened in a long, glowing moment. "Don't mind me," said the psychologist.

V.

Berk had no idea what time Mart went to bed that night. In the morning he found him in the same position working furiously, and had the impression Mart had not retired at all. He observed he'd changed clothes, at least.

"The fish are calling," said Berk.

Mart glanced up. "Give me another half hour. Look, the fish can wait. I've got to get back to the office as soon as possible. There's something here I want to keep on with."

Berk grinned agreeably. "Go to it, boy. I'll get the car packed. You say when."

In town he went directly to his own office without seeing anyone. There, he continued the work begun the night before. As he proceeded, some of his initial enthusiasm waned. It would be two or three days before he would be ready to invite inspection. One of his manipulations several pages back turned out to be in error. He retraced slowly through the maze.

A little after three there came a knock. He looked up in irritation as Dykstra walked in.

"Dr. Nagle! I'm glad you're in. I tried and couldn't find you yesterday."

"I took a day off for fishing. Can I help you?"

Dykstra slid into the chair on the other side of the desk with an almost furtive motion. Mart frowned.

"I have something of extreme importance to discuss regarding the project," said Dykstra. He leaned forward confidentially, his eyes squinting a little behind the owlish glasses.

"Do you realize," he said, "that this entire project is a fraud?"

"Fraud! What are you talking about?"

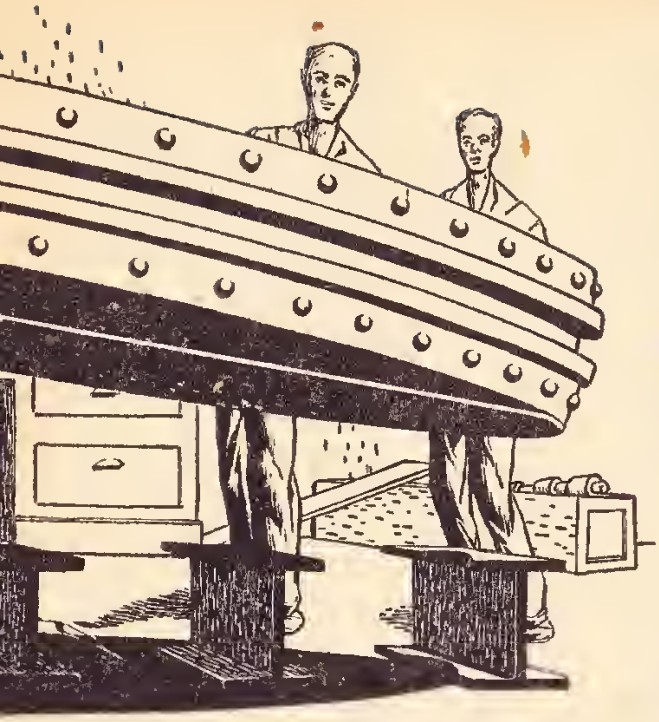
"I have been over the Dunning house, so called, with a fine toothed comb. I proved to you in our last seminar that the postulate of equivalence denied the possibility of any such device as this Dunning is supposed to have invented. Now, I can assure you that Dunning never existed! We are the victims of a base fraud."

He clapped the palms of his hands upon the top of the desk in triumphal finality and leaned back.

"I don't understand," murmured Mart.

"You shall. Go over that laboratory. There is no consistency. Examine the shelves of reagents. Ask what possible chemical endeavor could be carried out with such a random selection of materials. The electronics section is as hodgepodge as the corner television shop. The computers have never been used in the room they are in. And that library—it is obvious what an intellectual packrat's rest that is!

"No, Dr. Nagle, for some inconceivable reason we are the victims of a base fraud. Antigravity! Do you



suppose that anyone here actually thought they could make us believe it?

"Now, what I want to know is why we have been sent on this fool's errand when the nation needs the talents of each one of us so badly?"

Mart felt a faint sickness in the pit of his stomach. "I'll admit there are strange things about this presentation. If what you say should be true, how can the eyewitness accounts be explained?"

"Perjury!" snapped Dykstra.

"I can hardly imagine a member of the JCS involved in such. I am sorry, but I do not share your opinion. As a matter of fact, I have done a good deal of work toward our goal.

"As of this moment, I am prepared to say definitely that the postulate of equivalence is not going to hold."

Red-faced, Dykstra stood up. "I'm extremely sorry you hold such views, Dr. Nagle. I had always believed you a young man of great promise. Perhaps you shall yet be when proper light is thrown upon this abominable fraud perpetrated upon us. Good day!"

Mart didn't bother to rise as Dykstra stomped out the door. The visit bothered him. Absurd as the accusations were, they threatened the foundation upon which he worked. If he could not be sure that Dunning's device had performed as described he was subject to the buffeting of all his prior assurance that antigravity was nonsense.

But the JCS involved in a reasonless and silly fraud as Dykstra proposed—!

He turned back to his sheets of computations with almost frantic energy. When it was almost time that most of them would be leaving he reached for the phone and called Jennings. The man was an able mathematician and could work this through if any one could. It was not as far along as Mart would have liked it, but he had to know if he were at the entrance to a blind alley.

"Can you come over for a mo-

ment?" he said. "I've got something I'd like to show you."

In a few moments Jennings appeared. As he came in the door he gave Mart the momentary impression of an old-time country preacher ruffled with righteous indignation at the sins of his congregation.

He blurted out before Mart had a chance to speak. "Did you see Dykstra this afternoon running around with some cock and bull story about the project being a fraud?"

Mart nodded.

"Why Keyes ever let an old fool like him in here— Dyk has been a fine man. But he's shot his wad. I called Keyes at once."

"I guess all of us have had natural suspicions like Dykstra's," said Mart, "but not enough to go completely overboard as he has."

"I've talked to several of the others. They are upset, some of them. I tried to lift them out of it. But what is it you've got? Anything that looks like an answer?"

Mart slid the sheets across the desk. "The postulate of equivalence is out. I'm pretty sure of that. I've been computing the possible field of motion circulating through curved space. It turns out to be an eight-dimensional thing, but it makes sense. I'd like you to look it over."

Jennings' eyebrows raised. "Very good. Of course, it's not easy for me to accept the renunciation of the postulate of equivalence, you understand. That has been around for forty-five years now."

"We may find something to fit in its place."

"You have no other copy of this?"

Mart shrugged. "I can do it again."

"I'll take good care of them." Jennings put the papers in an inside pocket. "But suppose you do demonstrate the possibility of such a flow? Where do we go from there? Have you any idea?"

"Some," said Mart. "I watched a whirlpool yesterday. Ever watch what happens to sticks when they are thrown into one. They go toward each other. That's gravity."

Jennings frowned. "Now wait a minute, Mart—"

Mart laughed. "Don't get me wrong. Consider this flow. I don't know what properties it might have. It would have to take place through four of the dimensions involved. But when we get through, we'll develop the expression for the curl of such a flow through material substance.

"Suppose such a curl exists. Whirlpools appear. It's a crude analogy. Your mind can't get hold of it. We need the math. But perhaps we can show that the curl is in such a direction as to cause a reduction of spatial displacement between masses causing the curl. Could that make sense?"

Jennings had been sitting very still. Now he smiled and spread his hands on the desk top. "It could. The curl of an eight-dimensional flow would

be fairly complex. But if it develops all right, what then?"

"Then we build a device to streamline matter through this flow, so that curl will not develop."

Jennings sat back in his chair as if suddenly limp. "Holy smoke, you've got it all figured out! But wait a minute, that would simply nullify gravity. How about antigravity?"

Mart shrugged. "We find a way to introduce a reverse curl vector."

"That does it, boy, that does it."

Mart laughed and walked to the door with him. "Yeah, I know how the thing sounds, but, look—I'm really not kidding. If this gravitational flow expression works out, the rest of it could follow. It could, Jennings."

Jennings faced him with all amusement gone out of his face. "I'm not laughing, Mart," he said, "not at you, anyway. If we get the answer to this whole thing it's going to be something like that. It's just that everything we've postulated up to now has so completely blocked any thinking of this kind that a man has to be prepared to consider himself slightly rocky to even talk about it."

It was a day later when Berk called him. "Hey, Mart, why didn't you let us know right away about Dykstra? If Jennings hadn't called, we might have got to him too late."

"What do you mean?"

"This story he's been giving about the project's being a fraud. I hope you weren't bothered by it."

"Not much. Are you going to kick him off the project?"

"That follows, naturally. He's in a rest home now. His mind was so congealed that he couldn't accept the reality of Dunning's work. He flipped his lid in a mild sort of way. He'll be all right in a few weeks and can go back to teaching."

"I'm sorry about it. We almost have the answer he was afraid to face, I believe."

Impatiently, Mart threw his thesis open to the whole seminar that day. It was a bit hard to take for some who had been inclined somewhat in Dykstra's direction, but the math was clean enough to appeal to all of them. They pitched in almost as a solid unit to try to obtain a formulation convertible to metal and electrons and fields.

Jennings was the one who carried it all the way. He rushed into Mart's office three days later without knocking and slapped some sheets on the desk.

"You were right, Mart," he exclaimed. "Your field does show curl in the presence of material substance. We're on our way to Dunning's flying belt!"

But when it came, Mart was dismayed. The entire group worked in a thirty-six hour seminar to whip the work into final shape. The result was

that an antigravity machine could be built. But it would be the size of a hundred ton cyclotron!

Mart told Keyes what they had. "It's a far cry from Dunning's flying belt," he said. "We'll continue trying to boil it down if you want us to, or we can submit a practical design that will work now in the shape we've got it in."

Keyes glanced at the sketches Mart had prepared. "It isn't exactly what we'd expected, but I think we'd better build it. The important thing right now is to get a practical antigravity machine functioning. Refinements can come later. The shops are yours. How long will it take?"

"It depends on what you wish to put into it in the way of men and machines. With a round-the-clock crew I believe the model could be ready in about three weeks."

"It's yours," said Keyes. "Build it."

It was actually over four weeks before the first demonstration was scheduled in the big machine shop protected by the triple security seal that had shrouded the whole project.

Those in attendance were the ones present at the first conference plus a few of the workmen who had helped build the massive device.

The demonstration was simple, almost anticlimactic after the hectic seminars they had sweated out the past weeks. Mart stepped to the switchboard that seemed diminutive under the high, steel-arched ceiling of the shop. He threw the main power switches and then adjusted slowly a number of dials.

Almost imperceptibly, and without wavering, the enormous disklike mass rose in the center of the shop. It hovered without visible support three feet above the floor.

The disk was thirty feet in diameter and three feet thick. Its tonnage was evident in the long crack in the concrete floor beneath the I-beams laid temporarily to support it.

Dr. Keyes reached out a hand to touch the mass. He pushed with all his might.

Mart smiled and shook his head. "It'll move if you push long enough and hard enough. But it has almost the inertia of a small battleship. A far cry, as I said, from Dunning's flying belt. But we'll keep trying."

"It's a monumental achievement," said Keyes, "and I congratulate you all."

While they watched, Mart touched the controls again and slowly lowered the mass to the I-beam supports. He cut the power.

"I would like all of you to return to the conference room at this time," Keyes said. "There, we have some additional data to give you."

Mart fell in step beside Berk on the way out. "What's up now?" he said. "Are they going to pin tin medals on us?"

"Better than that," said Berk. "You'll see."

Once more they found themselves seated almost as they had been that eventful day weeks ago. Keyes took his usual position at the head.

"There is no need of telling any of you gentlemen what this achievement means to our country and for all mankind. Antigravity will revolutionize the military and peacetime transport of the world—and in time will take man to the stars.

"Now—I have someone I would like to introduce to you."

He stepped aside and beckoned through the doorway to the next room behind him. Someone came through in response. Then Keyes stood aside.

A startled gasp went through the audience. Before them stood Leon Dunning.

He smiled at the group a little wryly. "I see you know me, gentlemen. I hope none of you will bear me any hard feelings or consider me the repulsive character I have been painted. The script called for it. An unpleasant young jerk, is the way it was described I believe."

Jennings was on his feet. "What is the meaning of this, Dr. Keyes? I think we are entitled to an explanation!"

"Indeed you are, Dr. Jennings. And you shall have one." Keyes replaced Dunning who took a seat. "To a considerable extent, our friend, Professor Dykstra, was correct. The original data given you at the beginning of this project was a hoax."

A wave of startled cries and protests arose from the assembly. Keyes raised a hand. "Just a moment, please. Hear me out. I said that the initial data was a hoax. There was no Leon Dunning, inventor of antigravity devices. We put on a show, and faked a film. There was no antigravity.

"Today, there is an antigravity machine in existence. I want you to consider very carefully, gentlemen, just where the hoax in this matter truly lies." He paused for a moment, looking into the eyes of each of them, then stepped aside. "Our chief psychologist, Dr. Kenneth Berkeley, will give you the remainder of the story."

Berk got to his feet and moved to the front as if reluctant to do what had to be done.

"If any of you are angry," he said, "I am the person to whom it should be directed. Project Levitation was the direct result of my proposal.

"Do not think, however, that I am apologizing. I object to the term hoax, or fraud, which Professor Dykstra called it. How can we call it a hoax when out of it has come a thing with potentialities that cannot be grasped by any of us at this time?"

"But why, man, why?" Jennings exploded impatiently. "Why this hocus-pocus, this nonsense, this irrelevance about astrology, levitation, and mysticism! Why wasn't it set up

as a straightforward project. We aren't a bunch of high school kids to be tricked into something we don't want to do!"

"Suppose you give me the answer to that?" said Berk. "How would you have responded to a letter from Dr. Keyes inviting you to take part in a project to build an antigravity machine? How many of you would have remained in your safe and sane universities where crackpots are not allowed to spend the people's money as they are in Government institutions?

"We are thankful we had no more than one Professor Dykstra on the project. He refused to accept the data we provided and his goal became to prove antigravity impossible. How many of you would have come with the same goal if our little make-believe had not spurred you on?

"Dykstra could not face the data in a rational manner. As a result he suffered a nervous breakdown, which was, of course, the result of a long chain of previous incidents.

"On the other hand, those of you who could accept the data we handed you were able to knock out the preconceptions about antigravity and achieve that which you had considered impossible.

"Essentially, this was a project in psychology, not physics. We could have chosen something besides antigravity. The results, I predict, would have been the same. I have observed many scientists at work in the laboratory and library. I have studied the educational preconceptions they bring to their work. Before a problem is tackled, a decision is already made as to whether it is possible or impossible. In so many cases, as exemplified by Professor Dykstra, the interest in the problem is only to the extent of proving the decision correct.

"If you will forgive me for using you for guinea pigs in my project, I submit to you that I have given a far more powerful technique for scientific investigation than you have ever possessed before. The technique of the conviction that any desired answer can be found. You have not been hoaxed at all. You have been shown a new and powerful scientific method.

"If you could and did lick a problem previously impossible to you, in a matter of weeks, how many more of your own research problems are just waiting for this new approach?"

There was a good deal more said at the meeting. Some of it was highly confused. Berk's explanation was not understood at all by several of them.

It would take a long time for it to sink in thoroughly, even for him, Mart thought. There was just a trace of anger within him that he found hard to put down. But he chuckled at the smooth way in which Berk had engineered the project. He'd bet the psychologist had some uneasy moments because of Dykstra!

There was a sort of stunned feeling in his mind as he began to recognize the absolute truth of what Berk had demonstrated. He saw it reflected in the faces of some of the others, a sort of blank, why-didn't-somebody-tell-me-this-before look.

It was finally agreed they would meet again the next day to thresh out their reactions to what had been done.

As soon as they were able to break away, Berk took Mart's arm. "I almost forgot to tell you, you are invited to dinner tonight."

"*That* had better not be a hoax," said Mart.

After dinner, the two of them went out into the patio with which Berk struggled to give his city lot the dignity of an estate. They sat down on a garden seat and watched the moon come up through the neighbor's television antenna.

"I want the rest of it," said Mart.

"The rest of what?"

"Don't be coy. The rest of the guys are going to get it out of you in the morning, but I want it first."

Berk was silent for a while then he started speaking. He lit a pipe and got it going well. "Jennings almost had it in that speech about the floodgates of the mind which you mentioned. You and I almost had it back there when we were trying to solve the problems of the Universe in school.

"It boils down to the thing you asked me up in the mountains: What is the process of thinking? Where does original thought come from?

"Consider the abstruse equations you cooked up in a matter of days on the gravitational flow around the curvature of space. Why didn't you do it ten years ago? Why didn't somebody else do it a long time ago? Why you, and nobody else?

"I wanted you on the project especially, Mart, because I want you to give me a hand with this thing, if you will. It's a little more than I can handle. I don't know whether it's physics or psychology or some weird cross between the two.

"Anyway, here's where I started: You know communication theory. You know that any kind of data can be put in code form consisting of pulses. For example, a complex photograph codified in terms of half-tone dots. There are many possible methods of coding information into pulses. The code can use dot-dash, it can use time-separation between pulses, it can use pulse amplitude, a thousand different factors and combinations of factors. But *any* information can be expressed as a special sequence of pulses.

"One such sequence is: 'Every body in the universe attracts every other body in the universe'; another, 'The secret of immortality is—', and still another, 'Gravity is itself the result of the action of—and it can be nullified by—'

"*Any* answer to *any* question can be expressed in terms of a special sequence of pulses, wherein some relationship between the pulses is a codified expression of the information.

"But, by definition, pure noise is a completely random sequence of pulses, containing pulses in all possible relationships.

"Therefore: any information-bearing message is a special subclass of the class 'noise.' Pure noise, therefore, includes all possible messages, all possible information. Hence, pure noise, which is actually another term for pure probability, is omniscient!

"Now, that isn't just an exercise in scholastic logic. It is a recognition that all things can be learned, all things can be achieved."

Mart stirred and blew a violent cloud of cigar smoke at the moon. "Hold it!" he exclaimed. "There's got to be some limit to the territory you take in."

"Why? Is my logic wrong in regard to noise and information?"

"Gad, I don't know. It sounds good. It's right, of course, but exactly what does that have to do with the operation of the human mind and Project Levitation?"

"From a structural standpoint, I can't answer that question—yet. Functionally, it appears that there must be in the human mind a mechanism which is nothing but a pure noise generator, a producer of random impulses, pure omniscient noise.

"Somewhere else there must be another mechanism which is set to either filter the production of random noise or control its production so that only semantically meaningful forms are allowed to come through. Evidently, the filter is capable of being set at any level to filter out anything we choose to define as noise.

"So we go through the rough process of growing up, we go to school, and get educated, we get a red line setting on the noise filter which rejects all but a bare minimum of data presented by the external universe, and our internal creativeness as well.

"Facts in the world about us are rejected from then on when they don't fit. Creative imagination is whittled down. The filter takes care of it automatically once we give it a setting."

"And your project here," said Mart, "the stuff on Babylonian mysticism, astrology, and the rest of that crud—"

"The whole pattern was set to be as noisy as possible," said Berk. "*We* didn't know how to produce antigravity, so we gave you a picture of a man who did, and made it as noisy as possible to loosen up your own noise filters on the subject. I offered you a dose of omniscient noise on the subject of antigravity, and the one inescapable conclusion that it had been done.

"Everyone of you had previously set your filters to reject the idea of antigravity. Nonsense! No use looking

for that. Work on something useful.

"So I suggested to Keyes we assemble a bunch of you double-domes and slap you solidly with the fact that it ain't nonsense, it can be done, Bud. Give you some omniscient noise to listen to, loosen up your filters, and let the answer come through out of your own mental productiveness.

"It worked. It always will work. All you've got to do is get the lead out of your pants and the rocks out of your head, and the arbitrary noise filter settings corrected on a few of the other things you've always wanted to do—and you can find a proper answer to any problem you care to investigate!"

Mart glanced up at the moon spreading silver across the sky. "Yeah—there's the stars," he said. "I've always wanted the stars. Now we've got antigravity—"

"And so you can go to the stars—if you want to."

Mart shook his head. "You and Dunning—first we've got it, then we haven't.

"You get us to produce antigravity. And it becomes a mere gimmick! Sure we could see the planets, maybe even go beyond the solar system before we die. But I guess I'm going to stay here and work with you. A paltry planet or two isn't so much, after all. If we could learn to utilize the maximum noise level of the human mind we could master the whole Universe!"

THE END

IN TIMES TO COME

Poul Anderson is back next month with his first really long one—"Un-Man." The title is a rather nice double play, as you will find out by reading the piece. The "Un-Man" had a rough time with his enemies. They killed him in Singapore, and they killed him again in Shanghai, and in Denver, Madrid and Buenos Aires, also. He died of an accident on Mars, brought on partly by old age. At that time, however, he was working on the problem of his murderers in Buenos Aires and San Francisco while taking his wife—who didn't know he died in Denver—to safety.

The title is a double play—but the yarn somewhat more than that. The "Un-Man's" murderers were even more confused than that paragraph above suggests. . . .

Also coming up is the discussion of "The First *Power* Pile"—data on the new nuclear reactor at the Argonne Laboratories that produces more fissionable material than it uses and produces power at the same time. THE EDITOR.

PEST

BY RANDALL GARRETT AND LOU TABAKOW

__Einstein__ did not go far enough in his discussion of Relativity. Now consider the idea of what a "pest" is, for instance . . .

Koleen Makeer, sociologist, diplomat, and police officer, found herself suddenly in need of help; a situation which did not occur often to a member of the Galactic Service.

Not, let it be understood, that Koleen was superhuman; it was simply that there are very few situations in which G. S. officers will allow them-

selves to become embroiled unless they are masters of that situation. Unfortunately, her position was not one of Koleen's own choosing.

Judgment, in the spatiotemporal blur of ultralight velocities, is at best a touchy thing. Koleen had made a slight error in judgment which, quite luckily, did not result in her death. The Sqqinordian police cruiser had come too uncomfortably close to her course after having chased her better than fifteen hundred light-years from Sqqinor.

To evade it, she had made an almost suicidal dash at the last moment toward a nearby sun, rushing by it at a velocity far too great for the huge concentration of mass in the vicinity. It wouldn't have mattered much had she gone on in a geodesic line—the ship could have taken even that terrific strain. But Koleen asked too much of the ship.

In order to elude the pursuit that was boiling up so close behind, she changed course, turning four thousandths of a second of arc at almost precisely the wrong moment.

The ultralight generator warped, thereby killing the ship's mass-time field. Koleen suddenly found herself coasting gently toward a planet of the too-near sun.

A fatalist might have postulated that it was fate that permitted such a coincidence; any one of the millions of other religions in the galaxy might have credited it to some deity or other. Koleen gave credit to neither—she didn't even bother to think about it.

Nevertheless, at the exact moment when her mass-time field ceased to function, Koleen's ship was pointed toward a planet which was as near to being urthtype as any she had ever seen.

Quickly, automatically, the planetary drive began to function.

For a fleeting second, Koleen wondered where she was. Somewhere, she knew, in the vast star clouds of the central galaxy. But her exact bearings she did not—could not—know. Only the ship's homing autopilot could ever get her home again from here.

As she brought the ship to a smooth landing on a broad green plain of the miraculously handy planet, Koleen began to suffuse the air around her with a terminology which was not only unprintable—a large portion of it was unspellable. Koleen prided herself on the fact that in the fifty-two years she had been with Galactic Service she had learned to speak fluently in one hundred and thirty-one different languages and had learned to swear acidly in another two hundred or so.

Her first mistake had been to make that asinine remark about how nice and clean Sqqinor looked from a couple of thousand miles up; a statement which had roused the ire of a vast majority of the eight million inhabitants who had listened to her vised speech. She had been cut off at once, of course, by the Censor for Public

Morals and had barely had time to make it to her ship before the Sqqinordian police had been ordered to arrest her.

On top of that, she had made one of the most stupid blunders in interstellar navigation—that of coming too close to a stellar concentration of mass.

The only solace she could offer herself was that she had successfully evaded the Sqqinordian cruiser—for a time.

After thoroughly villifying her own character, intelligence, ability, and personal appearance—the last of which had not been enhanced by the foul clothing and lack of bathing enforced by her stay on Sqqinor—Koleen activated the front viewing plate and looked at the world outside.

She was completely surrounded by a vast spread of green which looked rather like a well-kept grass lawn. In the distance toward her right, she could see the lower slopes of a series of rolling hills. A glance at the sample intake indicator assured her that the air was breathable, although perhaps a little high in oxygen.

All in all, a very pretty place. But Koleen Makeer was not the explorer type. She would stay right inside her ship until she repaired its circuits. She was creeping up on the eighty mark, and middle-aged women, she reasoned, have no business prowling over the surface of a strange and possibly hostile world.

Koleen was one of those big, heavy-boned women that middle age doesn't seem to bother much. Her hair was beginning to gray a little, and she no longer possessed the beauty that accompanies the first flush of youth, but her features were handsomely regular, and her figure was still muscularly curvaceous. A woman doesn't survive long in the Galactic Service unless she keeps herself in condition.

For several minutes, she sat looking out at the green, meadowlike plain surrounding her without actually seeing it. Her mind was concentrating on the damage that might have occurred to her only means of transportation.

She suddenly realized that she was a little afraid to go down to the drive room and look, and that realization alone forced her down the narrow tubeway toward the drive compartment.

Then, for better than four hours, she meticulously searched the impressed circuits for damage. Area after area showed clear on the tester. Nothing. Then she climbed up over the massive plastoid circuit housing and opened up the ten-centimeter-square shield that covered the stasis generator.

The inside was covered with the shiny blackness of condensed metallic vapor. The short strip of neodymium in the transphase area had been completely vaporized by the energies that had blasted through it.

With a sigh of relief, Koleen opened

the spare-kit beneath the housing.

A cold hand grabbed hard at her throat. Empty!

Almost frantically, she pawed through the kit for the replacement strip that should have been there. The kit remained empty.

Then she calmed herself and bitterly consigned the idiot inspector who had forgotten to check her spare kit to the various hells of half a hundred civilizations. Almost sadistically, she pictured herself applying red-hot needles to some of the tenderer part of his anatomy.

She thought bitterly: *If I didn't know better, I'd think I was being plotted against!*

If only something had gone wrong with the impressed circuits! There was nothing simpler than re-impressing them on the molecular structure of the great plastic cube.

But no! It had to be the neodymium strip; a little piece of metal the easiest thing to replace imaginable.

All she needed was something to replace it with.

Wearily, hopelessly, Koleen climbed down off the drive generator, made her way forward to the sleeping compartment, plopped down on her narrow bunk, and stared at the wall.

If the Sqqinordians decided to search, it would be only a matter of days until they pinpointed her.

And sweet-talking her way out of this one was strictly impossible; the tentacled Sqqinordians were about as receptive to her charms as a hunk of granite. If she wanted to avoid a first-hand knowledge of the notorious Sqqinordian prison system, she'd better figure out a way to replace the ruined part.

Oh, sure! Replace the ruined part; as simple as that. The trouble was, how did one go about picking up a strip of neodymium on a primitive planet? From space she had seen no signs of cities or other indications of an advanced technology.

How did one go about locating a deposit of rare earths? How did one go about separating neodymium from the dozen other closely related elements?

Of course, she could always start toward home, using her planetary drive—that is, if she could figure a way to up her normal life expectancy from one hundred and fifty years to one hundred and fifty centuries.

She wrinkled her nose distastefully; she could already smell the fetid odor of a Sqqinordian prison.

The unbelievably bad luck that had caused that particular part of the drive to blow was canceled out by the equally unbelievable good luck that had put this particular planet in her path.

She smiled wryly to herself as an old axiom came to mind:

Every action has an equal and opposite reaction. Any change will have to be for the better.

That one releasing thought permitted

her to sleep. Exhausted as she was from the long periods of wakefulness that had been required to allow her to avade the Sqqinordian pursuit, it was not until then that the tension actually released itself.

The warning vibrator woke her. Refreshed by sleep, her normally highly reactive mind came fully awake at the first touch of the vibration. Something alive and moving was within range of the ship's detectors.

Moving quickly, she entered the control room and activated the transparency control of the front viewing screen. Before her spread a vast carpet of green resembling a well-kept lawn. A few kilometers to the right the level expanse gave way to a series of gently rolling slopes that led to a group of low undulating hills. The grasslike vegetation flowed over the hills in the same unbroken carpet.

Except for the greenish growth, no sign of trees or any other sort of plant life was visible, certainly no moving object that could have activated the vibrator.

She pulled on her bulky space armor, deciding that safety was more important than comfort in the present situation. Checking to make sure that her Ludenbergs were fully charged, she gingerly opened the lock and stepped out.

She noted that the green vegetation was mosslike and extended in an unbroken line to the horizon. Nowhere on the bright sunlit meadow could she see a moving form. She was about to reenter the lock to check the vibrator, when a peculiar scratching sound caused her to freeze in mid-stride. The rasping sound seemed to be coming from the hull. Something was on top of the ship!

You idiot! Falling for the oldest ambush in the book! If only they don't—

She eased out her Ludenbergs, and slowly raised her eyes toward the top of the hull.

Perched across the top of the ship were a group of cuddly-looking little animals closely resembling the koala, except for the fact that they had huge earlike appendages that stood erect like a rabbit's ears.

The group of little animals sat and gazed unblinkingly at her as though wondering what she was. As she gazed back a tremor shook them and the ears flopped down and hung flabbily like those of a hound, while the little creatures continued to stare at her.

Finally one of them stood and sedately began to climb down the sloping hull. Koleen couldn't help smiling at the solemn, precise maneuvering. It reached the ground and on its hind legs walked slowly toward her. She backed a couple of steps and raised her Ludenbergs in warning, but the little creature paid no attention to the threatening gesture.

It looked up at her with its solemn brown eyes and, raising its ridiculous floppy ears, brushed her armor-en-

closed calves with the tips.

She looked down with a smile.

"Well—if you're not a cute little fellow!"

Then, to herself: *Careful, Koleen. It may act like a kitten, but it's alien. It could be looking for the softest place to bite.*

She smiled at the thought of *any* animal, alien or not, biting through the tricarboluminum armor.

The little creature sat back on its haunches and gazed at her appealingly.

Feeling secure in her space armor, she reached down and lifted it into her arms. As she rubbed its smooth fur with her sheathed hand, it nestled closer against her and continually brushed her face-plate with the tips of its long ears.

"What's the matter, fella? Starved for affection?" she asked.

The little animal suddenly began to squirm and she dropped it to the ground, where it quieted and once more sat back and gazed at her.

Koleen stared back. *Well, if there's no intelligent life on this planet, at least it's plentifully supplied with pets.*

She lifted the little animal in her arms and stepped toward the lock of the ship. Koleen hesitated for a moment, and then shaking her head, gently lowered the little creature to the ground.

"No!" she said. "You'd better stay out."

Inside her ship, she stripped off the bulky armor, donned a pair of shorts and a sweat shirt, and once more took stock of the situation.

If the planet boasted any inhabitants with a high technological advancement, they took pains to keep the evidence as well as themselves well hidden. No, it was more likely that this was an unspoiled Eden completely overgrown with a layer of thick moss which evidently served as food for the gentle herbivorous little creatures who inhabited it.

Her planetary drive would easily bridge the distance to any of the sister planets in the system, but she doubted that she had enough time to make a star map and discover where any other planets might be. For that matter, it was more than likely that this was the only planet in the system capable of even supporting life. Despite the conjectures of theoretical biology, no form based on anything but carbon had ever been discovered.

She could use her ultrawave radio to ask for help, but long before it arrived the Sqqinordians would home in on her. She had no doubt that the receivers on the Sqqinordian Police Cruisers were all tuned and waiting for just such an attempt on her part.

No! The only answer was to flash into ultralight and be hundreds of light-years away before the Sqqinordians could locate her. With a good lead she could reach home sector before they could close in.

What she needed was a tiny strip of

neodymium!

She decided to try her luck at locating a deposit of the rare earths, though how she would go about the difficult task of separating out the neodymium—

I'll worry about that after I find the ore, she thought optimistically.

She pulled a one-piece coverall over her shorts and zipped it up. Her Ludenbergs would make good digging tools set at low power. She grabbed up an empty plastic container, folded it, and stuffed it into a pocket.

Got to have something to carry the ore —if I find any.

She had scarcely stepped out of the lock when the little animal was rubbing against her leg. It was the same one she had picked up before, judging by its markings. The rest were nowhere in sight.

She reached down and roughed its fur without slacking pace. Twice, before she reached the lower slopes of the hills, she almost fell as the little creature threw her off balance rubbing against her calves.

The second time she paused and pointed back toward the ship.

"Get lost, you little *pest,*" she commanded, with mock severity.

It fell back on its haunches as though hurt and gazed at her with limpid brown eyes.

She reached down and tenderly rubbed the top of its head.

"Don't get offended," she said half-teasingly, half-tenderly, "but you are a little pest."

It squirmed away at her touch, then stood erect and let its ears droop in so comical a manner that Koleen couldn't help grinning.

In a slight depression between two hummocks she stopped and looked around. The same unbroken carpet of green stretched out in all directions.

Koleen smiled wryly at her predicament. She had read once that the rare earths were quite common. Good. But quite common where—on one certain planet, or on any planet? On the surface or deep underground? In mountains or on alluvial plains? Did they come pure or mixed with other metals?

She looked at the little animal who sat regarding her quizzically.

"Can't you be some help, you nuisance? All I need is a tiny piece of neodymium about this big." She formed a "U" with her thumb and forefinger.

The ears stood up and the little creature turned its head from side to side in a ludicrous manner.

"Oh, never mind, come on," she laughed. Turning, she started off toward a hill that looked somewhat higher than the rest. A hill indicates rock strata close to the surface. *There might be a chance—*

The moss was fairly slippery, which made navigation of the hillside rather difficult, especially with the little animal tagging at her heels. Finally, she reached a moss-covered outcropping and stopped.

Carefully, she burned away the

vegetation with her Ludenberg, then kicked away the ashes and dust. Rock. She cut out a chunk of the rock, dropped it into the container, and went on.

Hours later, she had collected better than eighty samples, each tagged and numbered. The spectroscope on the ship would tell her whether any of them contained traces of the ore she needed.

Behind her, the flop-eared little creature gazed interestedly at her every motion.

Catastrophe came as she was climbing down a fairly steep hillside. The animal rubbed against her legs and, off balance as she was, Koleen slipped on the moss and fell, twisting her leg beneath her.

She started to get up and an excruciating pain shot through her ankle.

She sat on the soft moss and looked at the little creature who had backed up a pace.

"Now what do I do?"

Then, at its beseeching look: "Oh, it's not your fault. I guess you can't help it if you *are* a pest."

It crawled up on her lap trustingly, waving its ridiculous floppy ears.

Tenderly Koleen hugged the little beast to her, whereupon it began to wriggle in her arms until she let it tumble back to the ground. It raised its ears and regarded her unblinkingly.

Koleen slipped off the sweat shirt and made a tight bandage which enabled her to hobble painfully back to the ship with the little beast tagging along at her heels like a well-behaved puppy.

By the time she reached the ship dusk had come, and the mighty grandeur of the Central Galactic star clouds blazed in the sky.

The Pest followed her into the ship and watched quietly as she bathed her ankle.

She examined the injured member with the penetroscope and found, to her relief, that the pain was caused by nothing more than a strained tendon.

She wrapped it tightly with a bandage which enabled her to move about without too much pain.

As she leaned back to relax, the Pest came to her and crawled up into her lap. It raised its ears and brushed her face softly with the tips.

She grimaced at the tickling sensation.

"You *are* a pain in the neck," she informed him, holding her head out of reach.

He looked up at her and she smiled down tenderly.

Koleen felt the little body stiffen, and then began to struggle. She let him slide down to the floor where he once more grew quiet and stood regarding her.

She started to get ready for a shower still feeling unclean after her sojourn on Sqqinor. Then she looked down at

the little creature and slipped back into the coveralls.

"Come on, Pest," she said, lifting it and carrying it into the control cabin. "You wait here until I bathe. I feel like a goldfish with you staring at me all the time."

She closed the door, pulled off the coveralls, and switched on the water.

She was just beginning to enjoy the feeling of being clean for the first time in weeks when the cabin door swung open. Two eyes regarded her with undisguised fascination.

"I thought that door locked!" she cried.

She toweled herself vigorously while the little creature watched unemotionally.

She slipped into a robe and, scooping him up, unceremoniously dumped him outside the ship and closed the lock, checking to make sure it *was* locked.

Then she emptied the sack of rock samples and began preparing them for the analyzer.

Five minutes per sample. Eighty samples. Nearly seven hours had passed before she got the final reading from the machine. "Minute trace only."

Such a small amount that even the analyzer couldn't compute it. *None* of them contained neodymium.

Methodically, Koleen searched every square inch of the tiny ship to see if by chance the replacement strip somehow had got misplaced. No dice. The precious strip of metal was lying unnoticed at the bottom of some canine-bred mechanic's kit.

The strain of the past hours coupled with her injured foot was beginning to tell on Koleen, and she found her head nodding. Popping a "Nosleep" pill into her mouth, she sat down once more to try to figure out something.

No new ideas. She had exhausted every possibility. Every possibility? What a laugh! She had done nothing. But what was there to do? If only there had been some form of life on this planet with at least a rudimentary intelligence, she might have somehow been able to obtain the ore.

Instead, the sole inhabitants had to be a bunch of teddy bears.

Pest *was* a cute little fellow, though. He must have belonged to *someone* or *something* once, else why was he so starved for affection?

A *wild* animal doesn't crave affection!

Or did they? She couldn't know. Even if there were intelligent beings, she had no way of contacting them.

Still, it wouldn't do any harm to see.

She sprang to her feet and opened the lock. Pest stood there as though waiting.

"Come on in, you little devil," she cried.

He ambled in and, ignoring her this time, began to inspect the interior of the ship much as a puppy in a strange

place. He pawed around the controls and then seemed to find the radio interesting.

"Yes, Pest? Do you know something?" she cried excitedly.

At her voice he turned and sat back on his haunches, regarding her solemnly.

She cried exasperatedly, "Now I expect teddy bears to talk. I must be going off the deep end."

A sudden loud *bip* from the detector cut off her self-condemnation. She hopped painfully into the control room and looked at the screen.

A Sqqinordian cruiser had flashed by only a few light-years away!

Still, that *bip* shouldn't bother her too much. After all, it might simply mean that the Sqqinordian cruiser had given up the chase. They could only know the approximate volume of space where she had disappeared, and they might assume that she had eluded them permanently.

But somehow that didn't fit in with Sqqinordian psychology. She and they were a long way from both her own destination and Sqqinor, but *they* could radio for help and *she* didn't dare to. She could feel the uncomfortable thought scratching at the base of her prefrontal lobes:

They're not giving up. Not yet, anyway.

Koleen closed her eyes and mas-

saged the bridge of her nose with a thumb and forefinger. Her foot bothered her intensely, and her head had begun to ache from lack of sleep. For the hundredth time she cursed the inspector who had forgotten to put the spare strips in place, and cursed herself for not double-checking.

Something touched her leg, and she opened her eyes.

"Hello, Pest. What do you want now?" It was soothing to have the little creature around. Somehow, her deep-seated maternal instinct bathed all her troubles in a roseate aura when it was permitted to come to the fore.

"C'mere, you." She picked him up and began absently to caress the soft, smooth fur on his head. As usual, Pest squirmed and snuggled closer, his floppy ears-that-were-not-ears gently caressing her face.

"You're cute," she said, "but you'd be a lot cuter if you weren't always underfoot. Now get down. I have work to do." She set him down on the deck again and as she did so, Pest pricked up his ears, then let them droop disconsolately.

Koleen stood up and walked over to the refrigerator, trying to ignore the twinge in her bad leg and the chafing from the bandage. There didn't seem to be the slightest trace of hunger in her, only pain and weariness and worry. Still, she had to eat.

It was cold, and it was tasteless, and she had to force it down, but she seemed to feel a little better afterward—a little more relaxed.

Suddenly, a new thought came. Maybe she could get something on her receiver that would give her some sort of information. If she could disconnect the transmitter section so the instrument wouldn't spray her location all over space, she might be able to listen in on Sqqinordian communications.

At least it was something to do, something to keep her mind off the stink and horror of a Sqqinordian prison cell.

She prowled around through the tool locker until she had everything she might need, went back to the control room, and squatted on the floor in front of the transceiver unit. After making sure that the power was cut off at source, she removed the stelloid panel that protected the sensitive circuits from dust.

Then she plugged in the circuit tracer and began to feel her way around among the complexities of the circuits and pseudo-circuits before her.

Disconnect here—reconnect there—rebalance—change—add—subtract—replace—.

So intent was she on her work that the noise didn't seem to register for a moment. Then the crash was repeated, and she stood up quickly and walked as rapidly as possible back to the tool locker.

On the floor of the room sat the Pest, his ears drooping sadly, in the midst of the disarray that had fallen

from an open cabinet.

Koleen closed her eyes in a mixture of relief and dismay. The particular cabinet he had opened didn't contain any of the more delicate instruments, only cutters, clamps, and hammers. But this was the last straw; the little monster was going out now, and it was going to stay out. Even the companionship it gave wasn't worth the trouble.

She snapped out a harsh, hard epithet, stepped forward, grabbed it by the scruff of the neck and almost jerked it to its feet before she saw that its left foot was caught beneath a heavy machine hammer.

And, in that instant, all her resolution collapsed within her.

Her grasp on the Pest became more gentle, almost a caress. "Poor little fella! Does it hurt?" she asked softly.

Carefully, she lifted the hammer from the foot and eased it over to one side. "Quit squirming, stupid, you'll hurt yourself."

She picked up the little animal, carried it into her bunk, and opened the medical cabinet in the wall. Holding tight to the leg, she held the foot in the focus of the penetroscope and looked into the binocular eyepiece.

It was hard to tell, from the peculiar bone structure, whether everything was as it should be or not. There were no sharp edges, so it was probable that nothing was broken, but there might be something out of place.

"Now quit squirming!" she admonished the Pest again. With much difficulty, she managed to get the unhurt paw underneath the 'scope for comparison while holding the other to keep the Pest from hurting himself. As far as she could tell, the bones had not been hurt by the blow.

The musculature and tendon structure, too, seemed normal. About all she could find was a couple of surface areas where the cells had been crushed and the tissue bruised.

Finally she stood up and released Pest. "I think you'll live. I imagine it hurts a bit, but maybe that will teach you not to stick your nose where it doesn't belong."

Pest sat looking at her with an altogether inscrutable expression on its wide-eyed face. Koleen couldn't help grinning at the pestiferous little thing.

"Come on, bub, you're still going outside. I have work to do, and I can't be bothered by your shenanigans." She picked him up and carried him to the air lock.

"Out you go. But don't go too far," she added, placing him gently on the mosslike vegetation.

She closed the lock behind her and went back to the control room to the partially disabled transceiver.

Nearly three hours had passed before the two components were separated from each other enough to permit her to pick up signals without giving out any in return. Not until then did she energize the receiving sec-

tion and set it to the frequency used by the Sqqinordian Police.

The speaker hummed quietly to itself, but otherwise no sound came forth.

Perhaps, after all, they had actually given up the chase. Come to think of it, why did she consider herself so important to the offended moral code of Sqqinor? There was only one question: How long would she have to wait before she could safely send for help?

She looked at the detector screen. Nothing.

That, at least, was some consolation.

Should she, perhaps, get some sleep? The thought seemed to bring an almost unbearable weight down on her brain.

Great Heavens, yes, you fool!! Get into bed!

"Glyggithabordikolbixozz!" ejaculated the receiver imperatively.

Koleen snapped erect in her seat with the sudden realization that she had been half dozing.

"Plironobinngusdrothyliqq!"

Koleen couldn't understand it, but she recognized it for what it was. Scrambled Sqqinordian!

A sudden bright line crossed the detector and vanished. Less than eight light-years away and moving away from Sqqinor! She glanced at the recorder. During the few minutes she had dozed, no less than three traces had crossed the field of the detector. And all in the same direction!

They could not possibly be the same ship; the Sqqinordian forces were going to comb the area until they found her!

The black, dank walls of a Sqqinordian prison suddenly loomed around her, terrifying in their almost solid reality. There was nothing she could do but wait. They would comb every stellar system in the vicinity.

As long as she didn't use her drive, they wouldn't be able to locate her at stellar distances, but if they ever got within two or three billion miles of her, they could easily spot the latent energies in her ship. That meant they would have to cut their drive somewhere in the vicinity of every star and give their detectors a chance to find her.

She put her hand to her head. *Think! Think!*

She visualized the cone of space they would be searching; its apex at her last known position and its base—

Depending on the number of ships that were searching for her, she had, at least, two days.

The receiver kept up its intermittent harsh nonsense. Another bright line crossed the detector.

Come on, gal, pull yourself together! There was, after all, only one way out. She would have to call home, tell them what had happened, and let the Sqqinordian police pick her up. At least that way she wouldn't have to spend too much time in their padlocked sewers.

With an effort, she forced out of her mind the unpleasant realization that she would have to spend weeks—perhaps months—in the filthy, disease-ridden environment of the Sqqinordian prison system, eating the sickening unclean messes that would be pushed into her cell six times in every rotation of Sqqinor.

Forget it! If it's inevitable, lean back and enjoy it. It isn't as if I'll be there forever.

For the first time in years, loneliness seemed to creep into the ship with her. And, almost automatically, she went to the air lock and opened it. Pest was waiting there, patiently.

"Come on in, chum. I'm giving a going-away party. We'll get a bite to eat and I'll have a big bath and a good night's sleep before I call in."

She turned and walked back inside allowing the little animal to follow her, in its stately, deliberate manner.

Koleen knew full well that within an hour of her calling home the Sqqinordians would have her fully covered—boxed in—and under arrest for violation of their Morality Code. Therefore, any comforts she was going to enjoy would have to come now, before she called.

Pest didn't seem to appreciate any of the food she offered him. He didn't exactly turn up his nose at it, he simply seemed to look curiously at it as though he were trying to figure out what it could possibly be.

As far as Koleen was concerned, it tasted good. Now that she had decided upon a definite plan of action, the tension in her mind had completely relaxed. Even the horrors of Sqqinor couldn't disturb her equilibrium too much, once she had made up her mind to face them.

After the meal, she stripped off her coverall, stepped into the shower, and scrubbed herself thoroughly. She softly hummed the "Ballad of the Vagabond Lover" to herself and grinned inwardly when she thought of the additional scandal that would fall on her when the police cruisers picked her up and found that she had just bathed.

As she rubbed herself vigorously with the towel, the Pest stood watching her, his ears standing up on his head, giving him the appearance of a fat, slightly frightened jackrabbit.

"Where am I going to put you to keep you out of mischief while I take a nap? Come on."

She picked him up and carried him squirming into the sleeping compartment. There, she sat him in her bunk while she made a soft bed from some of her clothing.

"I don't know whether you sleep or not, but if you do, here's as good a place as that moss outside. For a while, this is going to be your sleeping quarters."

Koleen picked him up again, put him on the floor of the closet and pushed it shut.

"Good night, fella."

And then, for the first time in too many hours, she lay back on her bunk and collapsed into dreamless sleep.

She didn't even notice it when the closet door swung softly open. Pest stood blinking at her with his soft, large eyes.

Six hours later, feeling better than she had for days, Koleen set to work on the transceiver to connect the two sections together again in order to call home.

Would it be necessary to reconnect them completely? No, she decided, definitely not. She didn't need the scrambler, and the transceiver co-ordination was unnecessary, since she neither needed nor expected a reply to her message.

If she could—

The stelloid cover came off again, and she began to reconnect leads in the more vital places. She ignored the subtler interconnections that fused the two units into one smoothly integrated instrument—they didn't count just now.

Bzut! Bzzzzzzzzz!

Koleen turned quickly. Pest was standing over one of the testing machines. He had quite obviously pushed the master switch.

"Here, you! Get away from that!" Koleen grabbed at the little animal. Pest, startled, backed off. In the process, he stumbled over another piece of equipment and fell, crashingly, into the transceiver unit!

Disaster! As the little beast picked itself up from the debris, Koleen could only stare, her brain numb with shock.

Then sudden, flashing anger boiled to the surface.

"Why you little—!" She lapsed into Waldusian, a language which probably contains more shockingly foul expletives than any other language in the galaxy.

She grabbed him by one paw, dragged him bodily to the lock, and, with one well-aimed foot, sent him sprawling across the mossy vegetation. As she slammed the lock behind her, the Pest sat up. The expression in his eyes was, somehow, not quite so unfathomly blank as before.

Inside, Koleen stared at the transceiver. A closer, less emotional look showed that the wreckage was not as bad as it had looked at first. If that blockhead inspector hadn't forgotten to check the replacements for the radio, too, there might be a chance that she could repair the instrument before the Sqqinordians got there.

She opened the replacement kit, pulled out a drawer, and looked inside. The proper units were there all right, but they hardly even registered upon her consciousness.

Beside them, its green identifying stripe plainly visible across its center, lay a small *neodymium* strip.

Her brain seemed to shift suddenly into high gear without going through the intermediate stages of reasoning.

Had she taken the trouble to check herself, she would have found that less than eight minutes elapsed between the time she found the strip and the time she had secured it and was back at the control panel.

Cautiously, she lifted the ship above the planet's atmosphere, aimed it at a right angle to the Sqqinordian's line of search, and cut in the ultradrive. It would take them at least three minutes to get a line on her, and even more than that to align themselves along her course of flight. By then, she would be well away from them and could set her homing device to get her back home.

Half an hour later, she cut in the autopilot. She didn't know where she was, with respect to home, but the pilot did. It would get her there safely.

Then, having nothing better to do, she turned to the repair of the transceiver.

She thought grimly: *At least I don't have to worry about that Pest any more!*

Galoth to the Assembly: It is gone. As soon as it found the metal strip, it reacted as expected and removed itself from our world in order to escape its pursuers.

I wish to extend my apologies for not discerning its trouble earlier, but it was not until the thing became unconscious that I was able to discern what went on within its brain. Only with the aid of the metal strip could it leave.

The Assembly to Galoth: How can we be sure it will not return to our world?

Galoth: Neither it nor its pursuers know where our planet is with reference to their own. Their minds are of such small capacity that they must leave such orientation to a device in the ship. It is fortunate that I was able to find its need before it was able to use its home calling device. Had it done so, our world's location would have been known to them. As it is, I had to partially destroy the mechanism so that the thing would not call.

The Assembly: Have you ascertained what it was that caused such a disturbance along our neural bands?

Galoth: Partially. Our appearance was such that it called forth an emotional effect which filled our neural receptors with unwanted signals, thereby causing uncontrollable squirmings. Even when our receptors were lowered and inactive, contact with the creature was impossible because physical intimacy brought forth even stronger reactions. When the creature finally became unconscious, I was able to make enough contact to discover its need for the metal strip and its intention to use the calling device because the emotional reaction was inoperative.

The Assembly: It is good. The creature's telepathic disturbance was so great that it disrupted our communication almost to the breaking point. Our congratulations on your solution of the problem. At least we don't have to worry about that pest any more.

THE END

ME AND FLAPJACK AND THE MARTIANS

BY MACK REYNOLDS AND FREDRIC BROWN

Illustrated by Pawelka

Telepathy would, if nothing else, aid greatly in settling questions of relative intelligence of different species . . .

Wanta hear how Flapjack saved the world from the Martians, huh? All right, partner. It happened on the edge of the Mojave, just south of Death Valley. Me and Flapjack was . . .

"Flapjack," I told him complainingly, "you ain't worth a whoop no more since you done got rich. You're too all-fired proud these days to be ploddin' through the desert doing an honest day's work. Ain't yuh?"

Flapjack didn't answer. He ignored me and looked ahead of him disgustedly at the sand, the dust, the little clumps of cactus. He didn't have to answer; just his whole attitude made it plenty clear he wished we was back in Crucero, or maybe up in Bishop.

I frowned at him. "Sometimes," I told him, "I think you was just never

cut out for this, Flapjack. Oh, sure, you've spent most of your life in the desert and the mountains, just like I spent most of mine. And maybe you know 'em better than I do; I gotta admit it was you and not me that stumbled on that there last strike we made. But I still don't think you like the desert and the hills.

"I think I got reason for sayin' that, Flapjack. It's the way you've acted ever since we got a few dollars in the poke from that strike. Now you don't have to look hurt like that. You know the way you been carryin' on ever since we got money in the bank. A real caution. Why as soon as we get into Bishop or maybe Needles, what do you do? You make a beeline for the nearest saloon, that's what you do. Gotta let everybody in town know we got money to spend."

Flapjack yawned and kicked up the dust underfoot. He didn't mind my talking on and on, because you get to where you kind of like to hear somebody's voice out in the desert, but he wasn't paying no real attention to what I was saying. But I didn't let that stop me. I laid it into him.

I said, "And you ain't satisfied to spend our money in just one bar, neither. The minute you finish off a gallon of beer in one saloon, you head for the next. You're gettin' yourself talked about, Flapjack. But that don't make no difference to you. In fact, like I said, you're gettin' yourself so all-fired proud you don't care *what* anybody says about you.

"It ain't as though we got so much money we can retire. If we tried livin' in town permanentlike, we'd be flat broke in no time. Especially with the way you hang around in saloons and guzzle beer. Well, at least you don't buy drinks for the house; guess you think on account of that I ain't got no complaints comin'."

Flapjack snorted at my words and stopped.

"Oh, you think we oughta make camp, huh?" I said. I let my eyes go around the landscape. "All right, I guess one place is as good as another. Ain't no water within a dozen miles anyhow."

I took the pack off Flapjack's back and began to set up my little tent. I'd never packed a tent before I'd made my strike—or Flapjack had made it for me—but that hombre in the store had caught me in a weak moment with money in my pocket and he'd talked me into it. A piece of foofaraw, but it served Flapjack right for having to carry it.

Flapjack watched me for a minute and then ambled off to size up the possibilities of a little graze or such other grub as a burro can rustle up in the desert. I knew he wouldn't wander far and that I didn't have to watch him or hobble him, so I minded my own business and let him mind his.

It wasn't no exaggeration, what I'd been telling him. He'd been acting up for days and the reason was plain to see. Flapjack wanted to get back to where he could get his ration of beer every night, and some good fancy feed to top it off with. Ever since he kicked over that rock and made the silver strike, he's had credit in every bar in every town around here. He just walks in and the bartender fills a bucket with beer for him and he drinks it down, and then he ambles on to the next bar. He's crazy about beer. Holds it pretty well, too.

Maybe I should never have made the arrangements, but, like I said, it was Flapjack that made the strike, so I thought it was only fair. Even if once in a while I regret it, like the time he got in the fancy place in Crucero by mistake and got out in the middle of the fancy dance floor and—well, you can't expect a burro to know better than that, can you? And there

weren't any people dancin' just then anyway so I don't see what they made such a big fuss about. Funny thing, Flapjack never done anything like that in a place where he was welcome, and I sometimes wonder. Especially after what happened with the Martians. But we ain't quite got to that yet.

Anyway I was just jawing at Flapjack; I was gettin' just about ready for a trip to town myself, and maybe that's why I was takin' it out on him. I like a trip to town just as well as Flapjack does, only I ain't there no length of time before I get fed up with all the noise and the folks and the buildings and sleeping in beds and I just got to get out and head for the hills again. That's the only thing me and Flapjack really differ on; he'd rather stay longer.

I was makin' supper half an hour later and Flapjack probably thought I didn't see him go into the tent. He was scoutin' around for something to steal. Flapjack's the stealingest burro I ever did see. If he thinks it's something I want, he'll steal it quicker'n you can say "Holy Hominy," even if he don't like it or want it himself. I recollect the time I was gettin' tired of the way he'd swipe pancakes in the morning, so I cooked up a batch with lots of red pepper in them. You think he'd let out a peep? Not Flapjack. He was so happy about getting away with swiping my pancakes that he didn't care how awful they tasted.

Flapjack's a caution, Flapjack is. But I started out to tell you about the Martians. Maybe I better.

It was coming on morning; let's see now, just to be accuratelike, it must've been August 6th or maybe August 7th, sometimes you lose track in the desert.

Anyway, I opened my eyes when I heard Flapjack bray, real indignant-like. I knew something was up; Flapjack doesn't use that tone of bray unless. I stuck my head out of the tent just in time to see this here—well, balloon was what I thought it was at first—balloon on fire. Fire was shootin' out from beneath it like crazy. I expected a big explosion any minute.

But it didn't explode. The balloon settled down no more than maybe fifty feet away, and the flames died out.

"Holy Hominy," I said to myself and to Flapjack, "it must've blowed all the way from some fair somewheres."

I crawled the rest of the way out of the tent, figurin' on gettin' over to where that thing had come down to investigate-like. I didn't expect no folks to be there cause there wasn't no basket slung underneath. And if there had been, both the basket and the folks in it would've been fried to a crisp, the way that thing had been spouting fire as it came down.

I'd plumb forgot about Flapjack.

You can't blame him for feeling kind of skittish, but instead of runnin' away he'd backed up toward the tent. And when he heard me movin' behind him, he let go with his hind hoofs real quick. I don't think he done it on purpose.

But that's all I remember for a while.

When I woke up again, it was good and light. I must've been out at least an hour, could have been two. I put my hand up to my head and groaned and then, sudden, I remembered that balloon. I staggered up to my feet and looked over at it.

That balloon wasn't no balloon. I seen one balloon back in Missouri at a fair and I seen pictures of other ones, and this thing, whatever it was, wasn't any balloon. I'll guarantee you that.

Besides, whoever heard of anybody being *inside* a balloon?

Maybe I shouldn't say *anybody*, I should say *anything*, on account of the critters that was dartin' in and out of a door in the side of that thing sure wasn't ordinary folks. First thing that come to my mind was maybe it was something from a circus; they have the darndest freaks and animals—and contraptions, too—at a circus. Only I couldn't decide whether these things was freaks or animals. They was somewhere in between.

Anyhow, these critters was dartin' in and out of the big ball that I'd taken for a balloon, sometimes on their back legs sometimes on all fours. On two legs, they was about four feet high, and on four they was only knee-high to a heifer, on account of their legs—and arms, if their front legs was arms—was so short. They was carryin' all sorts of funny devices which they was settin' up on the desert just about halfway between me and that ball-contraption they went in and out of. And three of 'em swarmed around puttin' together what the others brought 'em.

Then I noticed Flapjack. He was standin' right near 'em and didn't look afraid at all. Just curious, like any burro is.

Well, I got up my courage and meandered over that way and took a look at the thing they was workin' on, but I couldn't make nothing of it. I said, "Hullo," and they didn't answer me and didn't pay no more attention to me than if I was a prairie dog.

So I went around 'em, keepin' my distance, and went up to the side of this ball and reached up and touched it. Holy Hominy! It was made out of metal as smooth and hard as the barrel of a Colt and it was as big as a two-story house.

One of the funny-lookin' little critters came along and shooed me away, kinda waving a thing in his hand that looked something like a flashlight. I had a sneaking suspicion that it wasn't no flashlight and I wasn't too

curious, just then, to find out what would happen if he did more than wave it at me, so I got. I went back about twenty feet or so and watched.

Pretty soon they seemed to have finished putting together whatever it was they'd been working on. Flapjack was standing only a few feet away from it by now, and I started to wander up closer but one of 'em waved a flashlight at me again and I got back.

Two of 'em stood there on their hind legs pulling levers and twisting knobs. There was a kind of loud-speaker on top of it, like you used to see on old-fashioned phonographs. Suddenly the loud-speaker said: "It should be correctly adjusted now, Mandu."

You could have knocked me down with a pebble. Here were these things looking like they'd escaped from a zoo and they had a talking machine of some kind or other. I sat down on a rock and stared at the loud-speaker.

"It would seem so," the loud-speaker said. "Now if this terrestrial has the type of mentality that we have deduced, we should be able to communicate."

All of the critters walked away from the device except one and he looked direct at Flapjack and said, "Greetings."

"Greetings, yourself," I said. "Flapjack's a burro, so how's about talking to me?"

"Will one of you," said the loud-speaker, "please attempt to stop that domesticated creature over there from making his fantastic noises?"

Flapjack hadn't been makin' any noise that *I* could hear. But a flashlight got waved at me so I shut up to see what'd happen.

"I assume," said the loud-speaker, "that you are the dominant intelligence of this planet. Greetings from the inhabitants of Mars."

A funny thing about that there loud-speaker; something makes me remember every dang word it said, just like it said 'em, even when I still don't rightly know what all the fancier words mean.

While I was tryin' to figure the answer to what they'd said, danged if

Flapjack didn't beat me to the draw. He opened his mouth, showed his teeth and brayed real hearty.

"Thank you," said the loud-speaker. "And in answer to your question, this is a sonic telepathor. It, in a manner of thinking, broadcasts my thoughts and they are reproduced in the mind of the listener in the language which he speaks and understands. The sounds you seem to hear are not the exact sounds that come from the speaker; it emits an abstract sound pattern which your subconscious, with the aid of the carrier wave, hears as expression in your own language. It is not selective; many creatures speaking many tongues would all understand what I am thinking. Our adjustment consisted in tuning the receiver part, which *is* selective, to the particular pattern of your individual intelligence."

"You're crazy," I yelled. "Why don't you fix that danged thing so it can understand what *I* say?"

"Please keep that animal quiet, Yagarl," said the loud-speaker. Flapjack looked at me over his shoulder reproachfully. That didn't worry me. But one of the critters with flashlights waved it at me again and that did. And anyway the speaker was blaring again and I wanted to hear what it said so I listened.

"We of Mars had the same difficulty," it was saying. "Happily, we have been able to solve the problem by substituting robots for domesticated animals. Obviously, however, you have a different situation. Through the lack of suitable hands, or even tentacles, you have found it necessary to domesticate one of the lower orders which is so equipped."

Flapjack brayed briefly and the loud-speaker said, "Naturally you wish to know the purpose of our visit. We wish your advice in solving a problem that is vital to us. Mars is a dying planet. Its water, its atmosphere, its mineral resources, are all practically exhausted. If we had been able to develop interstellar travel, we might seek an unoccupied planet somewhere in the galaxy. Unfortunately we have not; our ships will take us only to other planets in the solar system and only the discovery of an entirely new principle would enable us to reach the stars. We have not found even a clue to that principle.

"In the solar system, yours is the only planet—besides Mars—that can support Martian life. Mercury is too hot, Venus has no land surface and an atmosphere poisonous to us. The force of gravity of Jupiter would crush us and all of its moons are—like yours—airless. The outer planets are impossibly cold.

"So we are faced with the necessity, if we wish to survive, to move to Earth—peaceably if you submit; forcibly if we must use force. And we

have weapons that can destroy the population of Earth within days."

"Just a minute," I yelled. "If you think for a minute that you can—"

The critter who had been aiming a flashlight at me lowered it at my knees and, as I started toward the one who'd been operating the speaker contraption, he pushed a button. My knees suddenly went rubber and I fell down. Also I shut up.

My legs just didn't work at all. I had to use my arms to get to a sitting position so I could see what was going on.

Flapjack was braying.

"True," the speaker said. "That would be the best solution for both of us. We do not wish to occupy—by force or otherwise—an already civilized planet. If you can really suggest another answer to our problem—"

Flapjack brayed.

"Thank you," said the loudspeaker. "I am sure that will work out. Why we did not think of it ourselves I cannot imagine. We appreciate your assistance immeasurably; we offer you our heartfelt gratitude. We leave with good will in our hearts. We shall not return."

My knees worked again and I got up. I didn't go anywhere, though. My knees had been out of commission for a full minute and I was thinking that if that flashlight thing had been pointed higher and had stopped my heart working for a full minute I wouldn't be worrying about my knees.

Flapjack brayed just once more, and not for long this time. The funny-looking critters began to take their contraption with the speaker apart and carry it a piece at a time back to the big ball they'd come in.

It and them were all back in the balloon that wasn't a balloon in ten minutes, about, and the door in it closed. The bottom of it began to fire up again and I ran back to where my tent was and watched from there. And all of a sudden the contraption *whooshed* upward and disappeared almost straight up into the sky.

Flapjack came strolling over toward me, kind of avoiding my eyes, like.

"You think you're pretty smart, don't you?" I asked him.

He wouldn't answer me.

But I guess he did think so. Later on that same day he stole my pancakes again.

And that's the whole story, partner. That's how Flapjack saved the world from the Martians. You want to know what he told 'em? Well, I'd like to know, too, but he won't tell me. Hey, Flapjack, come over here. You had enough beer for tonight.

All right, partner, here he is. You ask him. Maybe he'll tell you. *Or maybe he won't. Flapjack's a caution, Flapjack is. But go ahead and ask him.*

THE END

THE IMPACTED MAN

BY ROBERT SHECKLEY

A contractor on a big job is apt to have many headaches. Little things can go wrong —minor flaws that mar the whole work.

Illustrated by Orban

TO: CENTER
Office 41
ATTN: Controller Miglese
FROM: Contractor Carienomen
SUBJ: ATTALA Metagalaxy
Dear Controller Miglese:

This is to inform you that I have completed contract 13371A. In the region of space coded ATTALA I have constructed one metagalaxy, incorporating 549 billion galaxies, with the normal distribution of star clusters, variables, novae, et cetera. See attached data sheet.

The outer limits of ATTALA metagalaxy are defined in the accompanying map.

Speaking for myself, as chief designer, and for my company, I am confident that we have done a sound construction job, as well as a work of great artistic merit.

We welcome your inspection.

Having fulfilled the terms of our contract, the agreed-upon fee is payable at any time.

Respectfully,
Carienomen

Enclosed:
1 data sheet, installations
1 map of metagalaxy ATTALA

TO: Construction Headquarters
334132, Extension 12
ATTN: Chief Designer, Carienomen
FROM: Asst. Controller Miglese
SUBJ: ATTALA Metagalaxy
Dear Carienomen:

We have inspected your construction, and have held up your fee accordingly. Artistic! I suppose it's artistic. But haven't you forgotten our prime concern in construction work?

Consistency, just to remind you.

Our inspectors discovered large amounts of unexplained data occurring even around the metagalactic center, a region one would think you would build with care. That can't go on. Luckily, the region is unpopulated.

And that's not all. Would you care to explain your spatial phenomena? What in chaos is this red shift you've built in? I've read your explanation of it, and it doesn't make any sense to me. How will planetary observers take it?

Artistry is no excuse.

Furthermore, what kinds of atoms are you using? Carienomen, are you trying to save money with shoddy materials? A good percentage of those atoms were unstable! They break down at the touch of a finger, or even without the touch of a finger. Couldn't you figure out any other way of lighting your suns?

Enclosed is a data sheet, outlining the findings of our inspectors. No payment until they're cleared up.

And there is another serious matter, just brought to my attention. Evidently you weren't watching too closely for stresses and strains in your spatial fabric. We have detected a time-flaw near the periphery of one of your galaxies. It is small, at present, but it could *grow. I suggest that you take care of it at once, before you have to rebuild a galaxy or two.*

One of the inhabitants of a planet

impinging on the flaw is impacted already; wedged into the flaw, due entirely to your carelessness. I suggest that you correct this before he moves out of his normal time-sequence, creating paradoxes right and left.

Get in touch with him, if need be.

Also, I have word of unexplained phenomena on some of your planets; items such as flying pigs, moving mountains, ghosts, and others, all enumerated in the complaint sheet.

We won't have this sort of thing, Carienomen. A paradox is strictly forbidden in the created galaxies, since a paradox is the inevitable forerunner of chaos.

Take care of that impaction at once. I don't know whether the impacted individual realizes it yet.

Miglese

Enclosed:
1 complaint sheet

Kay Masrin folded the last blouse into the suitcase, and, with her husband's assistance, closed it.

"That's that," Jack Masrin said, hefting the bulging case. "Say good-by to the old homestead." They looked around at the furnished room where they had spent their last year.

"Good-by, homestead," Kay said. "Let's not miss the train."

"Plenty of time." Masrin started to the door. "Shall we say good-by to Happy Boy?" They had given Mr. Harf, their landlord, that nickname because he smiled, once a month, when they handed him the rent. Of course, he immediately reshaped his mouth to its usual prim line.

"Let's not," Kay said, smoothing out her tailored suit. "He just might wish us luck, and what would happen then?"

"You're perfectly right," Masrin said. "No use starting a new life with Happy Boy's blessings. I'd rather have the Witch of Endor curse me."

With Kay following him, Masrin walked to the head of the stairs. He looked down at the first floor landing, started to take the first step, and stopped abruptly.

"What's wrong?" Kay asked.

"Have we forgotten anything?" Masrin asked, frowning.

"I checked all the drawers and under the bed. Come on, we'll be late.

Masrin looked down the stairs again. Something was bothering him. He searched quickly for the source of the trouble. Of course, they had practically no money. But that had never worried him in the past. He *did* have a teaching job, finally, even if it was in Iowa. That was the important thing, after a year of working in a bookstore. Everything was going right. Why should he be worried?

He took a step down, and stopped again. The feeling was stronger. There was something he shouldn't do. He glanced back at Kay.

"Do you hate leaving that much?" Kay asked. "Let's go, or Happy Boy'll charge us another month's rent. Which,

for some strange reason, we haven't got."

Still Masrin hesitated. Kay pushed past him and trotted downstairs.

"See?" she said from the first floor landing. "It's easy. Come on. Walk to Mummy."

Masrin mumbled a few subdued curses and started down the stairs. The feeling became stronger.

He reached the eighth step, and—

He was standing on a grassy plain. The transition was as sudden as that.

He gasped and blinked. The suitcase was still in his hand. But where was the brownstone? Where was Kay? Where, for that matter, was New York?

In the distance was a small blue mountain. There was a clump of trees nearby. In front of the clump was a dozen or so men.

Masrin was in a dreamlike state of shock. He observed, almost idly, that the men were short, swarthy, thickly muscled. They wore loin cloths, and carried beautifully carved and polished clubs.

They were watching him, and Masrin decided it was a tossup, who was the most surprised.

Then one of them grunted something, and they started moving toward him.

A club bounced off his suitcase.

The shock dissolved. Masrin turned, dropped the suitcase and ran like a greyhound. A club whacked his spine, nearly knocking him over. He was facing a little hill, and he bounded up it, arrows showering around him.

A few feet up, he realized that he was back in New York.

He was at the top of the stairs, still in full stride, and before he could stop himself he had run into the wall. Kay was on the first floor landing, looking up. She gasped when she saw him, but didn't say anything.

Masrin looked at the familiar murky mauve walls of the brownstone, and at his wife.

No savages.

"What happened?" Kay whispered, white-faced, coming up the stairs.

"What did you see?" Masrin asked. He didn't have a chance to feel the full impact of what had happened. Ideas were pouring into his head, theories, conclusions.

Kay hesitated, gnawing at her lower lip. "You walked down a couple of steps and then you were gone. I couldn't see you any more. I just stood there and looked and looked. And then I heard a noise, and you were back on the stairs. Running."

They walked back to their room and opened the door. Kay sat down at once on the bed. Masrin walked around, catching his breath. Ideas were still pouring in, and he was having trouble sifting them.

"You won't believe me," he said.

"Oh won't I? Try me!"

He told her about the savages.

"You could tell me you were on Mars," Kay said. "I'd believe you. I saw you disappear!"

"My suitcase!" Masrin said suddenly, remembering that he had dropped it.

"Forget the suitcase," Kay said.

"I have to go back for it," Masrin said.

"No!"

"I must. Look, dear, it's pretty obvious what happened. I walked through some sort of a time-flaw, which sent me back to the past. I must have landed in prehistoric times, to judge by the welcoming committee I met. I have to go back for that suitcase."

"Why?" Kay asked.

"Because I can't allow a paradox to occur." Masrin didn't even wonder how he knew this. His normal egotism saved him from wondering how the idea had originated in his mind.

"Look," he said, "my suitcase lands in the past. In it I've got an electric shaver, some pants with zippers, a plastic hairbrush, a nylon shirt, and a dozen or so books—some of them published as late as 1951. I've even got Ettison's 'Western Ways' in there, a text on Western civilization from 1490 to the present day.

"The contents of that case could give these savages the impetus to change their own history. And suppose some of that stuff got into the hands of Europeans, after they discovered America? How would that affect the present?"

"I don't know," Kay said. "And you don't either."

"Of course I know," Masrin said. It was all crystal-clear. He was amazed that she wasn't able to follow it logically.

"Look at it this way," Masrin said. "Minutiae makes history. The present is made up of a tremendous number of infinitesimal factors, which shaped and molded the past. If you add another factor to the past, you're bound to get another result in the present. But the present is as it is, unchangeable. So we have a paradox. And there can't be any paradox!"

"Why can't there?" Kay asked.

Masrin frowned. For a bright girl, she was following him very poorly. "Just believe me," he said. "Paradox isn't allowed in a logical universe." Allowed by whom? And he had the answer.

"The way I see it," Masrin said, "there must be a regulating principle in the universe. All our natural laws are expressions of it. This principle can't stand paradox, because . . . because—" He knew that the answer had to do with suppressing the fundamental chaos, but he didn't know why.

"Anyhow, this principle can't stand paradox."

"Where did you get that idea?" Kay asked. She had never heard Jack talk that way before.

"I've had these ideas for a long time," Masrin said, and believed it. "There was just never any reason

to talk about it. Anyhow, I'm going back for my suitcase."

He walked out to the landing, followed by Kay. "Sorry I can't bring you any souvenirs," Masrin said cheerfully. "Unfortunately, that would result in a paradox also. Everything in the past has had a part in shaping the present. Remove something, and it's like removing one unknown from an equation. You wouldn't get the same result." He started down the stairs.

On the eighth step, he disappeared again.

He was back in prehistoric America. The savages were gathered around the suitcase, only a few feet from him. They hadn't opened it yet, Masrin noticed thankfully. Of course, the suitcase itself was a pretty paradoxical article. But its appearance—and his—would probably be swallowed up in myth and legend. Time had a certain amount of flexibility.

Looking at them, Masrin couldn't decide if they were forerunners of Indians, or a separate sub-race which didn't survive. He wondered if they thought he was an enemy, or a garden-variety evil spirit.

Masrin darted forward, shoved two of them aside, and grabbed his suitcase. He ran back, circling the little hill, and stopped.

He was still in the past.

Where in chaos was that hole in time, Masrin wondered, not noticing the strangeness of his oath. The savages were coming after him now, starting around the little hill. Masrin almost had the answer, then lost it as an arrow sped past him. He sprinted, trying to keep the hill between himself and the Indians. His long legs pumped, and a club bounced behind him.

Where was that hole in time? What if it had moved? Perspiration poured from his face as he ran. A club grazed his arm, and he twisted around the side of the hill, looking wildly for shelter.

He met three squat savages, coming after him.

Masrin fell to the ground as they swung their clubs, and they tripped over his body. Others were coming now, and he jumped to his feet.

Up! The thought struck him suddenly, cutting through his fear. Up!

He charged the hill, certain that he would never reach the top alive.

And he was back in the boarding house, still holding the suitcase.

"Are you hurt, darling?" Kay put her arms around him. "What happened?"

Masrin had only one rational thought. He couldn't remember any prehistoric tribe that carved their clubs as elaborately as these savages. It was almost a unique art form, and he wished he could get one of the clubs to a museum.

Then he looked at the mauve walls wildly, expecting to see the savages come bounding out of them. Or per-

haps there were little men in his suitcase. He fought for control. The thinking portion of his mind told him not to be alarmed; flaws in time were possible, and he had become wedged, impacted in one. Everything else followed logically. All he had to do—

But another part of his mind wasn't interested in logic. It had been staring blankly at the impossibility of the whole thing, uninfluenced by any rational arguments. That part knew an impossibility when it saw one, and said so.

Masrin screamed and fainted.

TO: CENTER
Office 41
ATTN: Asst. Controller Miglese
FROM: Contractor Carienomen
SUBJ: ATTALA Metagalaxy
Dear Sir:

I consider your attitude unfair. True, I have utilized some new ideas in my approach to this particular metagalaxy. I have allowed myself the latitude of artistry, never thinking I would be beset by the howls of a static, reactionary CENTER.

Believe me, I am as interested as you in our great job—that of suppressing the fundamental chaos. But in doing this, we must not sacrifice our values.

Enclosed is a statement of defense concerning my use of the red shift, and another statement of the advantages gained by using a small percentage of unstable atoms for lighting and energy purposes.

As to the time-flaw, that was merely a small error in duration-flow, and has nothing to do with the fabric of space, which is, I assure you, of first-rate quality.

There is, as you pointed out, an individual impacted in the flaw, which makes the job of repair slightly more difficult. I have been in contact with him, indirectly of course, and have succeeded in giving him a limited understanding of his role.

If he doesn't disturb the flaw too much by time-traveling, I should be able to sew it up with little difficulty. I don't know if this procedure is possible, though. My rapport with him is quite shaky, and he seems to have a number of strong influences around him, counseling him to move.

I could perform an extraction of course, and ultimately I may have to do just that. For that matter, if the thing gets out of hand I may be forced to extract the entire planet. I hope not, since that would necessitate clearing that entire portion of space, where there are also local observers. This, in turn, might necessitate rebuilding an entire galaxy.

However, I hope to have the problem settled by the time I next communicate with you.

The warp in the metagalactic center was caused by some workmen leaving a disposal unit open. It has been closed.

The phenomena such as walking mountains, et cetera, are being handled in the usual way.

Payment is still due on my work.

Respectfully,

Carienomen

Enclosed:
1 statement, 5541 pages, Red Shift
1 statement, 7689 pages, Unstable Atoms

TO: Construction Headquarters
334132, Extension 12
ATTN: Contractor Carienomen
FROM: Asst. Controller Miglese
SUBJ: ATTALA Metagalaxy
Carienomen:

You will be paid after *you can show me a logical, decently constructed job. I'll read your statements when and if I have time. Take care of the flaw-impaction before it tears a hole in the fabric of Space.*

Miglese

Masrin recovered his nerve in half an hour. Kay put a compress on a purple bruise on his arm. Masrin started pacing the room. Once again, he was in complete possession of his faculties. Ideas started to come.

"The past is down," he said, half to Kay, half to himself.

"I don't mean really 'down'; but when I move in that apparent direction, I step through the hole in time. It's a case of shifted conjoined dimensionality."

"What does that mean?" Kay asked, staring wide-eyed at her husband.

"Just take my word for it," Masrin said. "I can't go down." He couldn't explain it to her any better. There weren't words to fit the concepts.

"Can you go up?" Kay asked, completely confused.

"I don't know. I suppose, if I went up, I'd go into the future."

"Oh, I can't stand it," Kay said. "What's wrong with you? How will you get out of here? How will you get down that haunted staircase?"

"Are you people still there?" Mr. Harf's voice croaked from outside. Masrin walked over and opened the door.

"I think we're going to stay for a while," he said to the landlord.

"You're not," Harf said. "I've already rented this room again." Happy Boy Harf was small and bony, with a narrow skull and lips as thin as a spider's thread. He stalked into the room, looking around for signs of damage to his property. One of Mr. Harf's little idiosyncrasies was his belief that the nicest people were capable of the worst crimes.

"When are the people coming?" Masrin asked.

"This afternoon. And I want you out before they get here."

"Couldn't we make some arrangement?" Masrin asked. The impossibility of the situation struck him. He couldn't go downstairs. If Harf forced him out, he would have to go to prehistoric New York, where he was sure his return was eagerly awaited.

And there was the over-all problem of paradox!

"I'm sick," Kay said in a stifled

little voice. "I can't leave yet."

"What are you sick from? I'll call an ambulance if you're sick," Harf said, looking suspiciously around the room for any signs of bubonic plague.

"I'd gladly pay you double the rent if you'd let us stay a little longer," Masrin said.

Harf scratched his head, and stared at Masrin. He wiped his nose on the back of his hand, and said, "Where's the money?"

Masrin realized that he had about ten dollars left, and his train tickets. He and Kay were going to ask for an advance as soon as they reached the college.

"Broke," Harf said. "I thought you had a job at some school?"

"He does," Kay said staunchly.

"Then why don't you go there and get out of my place?" Harf asked.

The Masrins were silent. Harf glared at them.

"Very suspicious. Get out before noon, or I'll call a cop."

"Hold it," Masrin said. "We've paid the rent for today. The room's ours until twelve midnight."

Harf stared at them. He wiped his nose again, thoughtfully.

"Don't try staying one minute over," he said, stamping out of the room.

As soon as Harf was gone, Kay hurried over and closed the door. "Honey," she said, "why don't you call up some scientists here in New York and tell them what's happened? I'm sure they'd arrange something, until . . . how long will we have to stay here?"

"Until the flaw's repaired," Masrin said. "But we can't tell anyone; especially, we can't tell any scientists."

"Why not?" Kay asked.

"Look, the important thing, as I told you, is to avoid a paradox. That means I have to keep my hands off the past, and the future. Right?"

"If you say so," Kay said.

"We call in a team of scientists, and what happens? Naturally, they're skeptical. They want to *see* me do it. So I do it. Immediately, they bring in a few of their colleagues. *They* watch me disappear. Understand, all this time there's no proof that I've gone into the past. All they know is, if I walk downstairs, I disappear.

"Photographers are called in, to make sure I'm not hypnotizing the scientists. Then they demand proof. They want me to bring back a scalp, or one of those carved clubs. The newspapers get hold of it. It's inevitable that somewhere along the line I produce a paradox. And do you know what happens then?"

"No, and you don't either."

"I do," Masrin said firmly. "Once a paradox is caused, the agent—the man who caused it—me—disappears. For good. And it goes down in the books as another unsolved mystery. That way, the paradox is resolved in its easiest way—by getting rid of the

paradoxical element."

"If you think you're in danger, then of course we won't call in any scientists," Kay said. "Although I wish I knew what you were driving at. I don't understand anything you've said." She went to the window and looked out. There was New York, and beyond it, somewhere, was Iowa, where they should be going. She looked at her watch. They had already missed the train.

"Phone the college," Masrin said. "Tell them I'll be delayed a few days."

"Will it be a few days?" Kay asked. "How will you ever get out?"

"Oh, the hole in time isn't permanent," Masrin said confidently. "It'll heal — if I don't go sticking myself in it."

"But we can only stay here until midnight. What happens then?"

"I don't know," Masrin said. "We can only hope it'll be fixed by then."

TO: CENTER
Office 41
ATTN: Asst. Controller Miglese
FROM: Contractor Carienomen
SUBJ: MORSTT Metagalaxy
Dear Sir:

Herein, enclosed, is my bid for work on the new metagalaxy in the region coded MORSTT. If you have heard any discussions in art circles recently, I think that you will see that my use of unstable atoms in ATTALA Metagalaxy has been proclaimed "the first great advance in creative engineering

since the invention of variable time-flow." See the enclosed reviews.

My artistry has stirred many favorable comments.

Most of the inconsistencies—natural *inconsistencies, let me remind you—in ATTALA Metagalaxy have been corrected. I am still working with the man impacted in the time-flaw. He is proving quite co-operative; at least, as co-operative as he can be, with the various influences around him.*

To date, I have coalesced the edges of the flaw, and am allowing them to harden. I hope the individual remains immobile, since I really don't like to extract anyone or anything. After all, each person, each planet, each star system, no matter how minute, has an integral part in my metagalactic scheme.

Artistically, at any rate.

Your inspection is welcomed again. Please note the galactic configurations around the metagalactic center. They are a dream of beauty you will wish to carry with you always.

Please consider my bid for the MORSTT Metagalaxy project in light of my past achievements.

Payment is still due on ATTALA Metagalaxy.

Respectfully,

Carienomen

Enclosed:
1 bid, for MORSTT Metagalaxy project
3 critical reviews, ATTALA Metagalaxy

"It's eleven forty-five, honey," Kay said nervously. "Do you think we could go now?"

"Let's wait a few minutes longer," Masrin said. He could hear Harf prowling around on the landing, waiting eagerly for the dot of twelve.

Masrin watched the seconds tick by on his wrist watch.

At five minutes to twelve, he decided that he might as well find out. If the hole wasn't fixed by now, another five minutes wouldn't do it.

He placed the suitcase on the dresser, and moved a chair next to it.

"What are you doing?" Kay asked.

"I don't feel like trying those stairs at night," Masrin said. "It's bad enough playing with those pre-Indians in the daylight. I'm going to try going up, instead." His wife gave him an under-the-eyelids now-I-know-you're-cracking look.

"It's not the stairs that does it," Masrin told her again. "It's the act of going up or down. The critical distance seems to be about five feet. This will do just as well."

Kay stood nervously, clenching and unclenching both hands, as Masrin climbed on the chair and put one foot on the dresser. Then the other, and he stood up.

"I think it's all right," he said, teetering a little. "I'm going to try it a little higher."

He climbed on the suitcase.

And disappeared.

It was day, and he was in a city. But the city didn't look like New

York. It was breathtakingly beautiful —so beautiful that Masrin didn't dare breathe, for fear of disturbing its fragile loveliness.

It was a place of delicate, wispy towers and buildings. And people. But what people, Masrin thought, letting out his breath with a sigh.

The people were blue-skinned. The light was green, coming from a green-tinged sun.

Masrin drew in a breath of air, and strangled. He gasped again, and started to lose his balance. There was no air in the place! At least, no air he could breathe. He felt for a step behind him, and then tumbled down—

To land, choking and writhing, on the floor of his room.

After a few moments he could breathe again. He heard Harf pounding on the door. Masrin staggered to his feet, and tried to think of something. He knew Harf; the man was probably certain by now that Masrin headed the Mafia. He would call a cop if they didn't leave. And that would ultimately result in—

"Listen," he said to Kay, "I've got another idea." His throat was burning from the atmosphere of the future. However, he told himself, there was no reason why he should be surprised. He had made quite a jump forward. The composition of the Earth's atmosphere must have changed, gradually, and the people had adapted to it. But it was poison for him.

"There are two possibilities now," he said to Kay. "One, that under the prehistoric layer is another, earlier layer. Two, that the prehistoric layer is only a temporary discontinuity. That under it, is present New York again. Follow me?"

"No."

"I'm going to try going under the prehistoric layer. It might get me down to the ground floor. Certainly, it can't be any worse." Kay considered the logic of going some thousands of years into the past in order to walk ten feet, but didn't say anything.

Masrin opened the door and went out to the stairs, followed by Kay. "Wish me luck," he said.

"Luck, nothing," Mr. Harf said, on the landing. "Just get out of here."

Masrin plunged down the stairs.

It was still morning in prehistoric New York, and the savages were still waiting for him. Masrin estimated that only about half an hour had gone by here. He didn't have time to wonder why.

He had caught them by surprise, and was twenty yards away before they saw him. They followed, and Masrin looked for a depression. He had to go down five feet, in order to get out.

He found a shelving of the land, and jumped down.

He was in water. Not just on the surface, but *under*. The pressure was tremendous, and Masrin could not see

sunlight above him.

He must have gone "through" to a time when this section was under the Atlantic.

Masrin kicked furiously, eardrums bursting. He started to rise toward the surface, and—

He was back on the plain, dripping wet.

This time, the savages had had enough. They looked at him, materialized in front of them, gave a shriek of horror, and bolted.

This water sprite was too strong for them.

Wearily, Masrin walked back to the hill, climbed it, and was back in the brownstone.

Kay was staring at him, and Harf's jaw was hanging slack. Masrin grinned weakly.

"Mr. Harf," he said, "will you come into my room? There's something I want to tell you."

TO: CENTER
Office 41
ATTN: Asst. Controller Miglese
FROM: Contractor Carienomen
SUBJ: MORSTT Metagalaxy
My dear Sir:

I cannot understand your reply to my bid for the job of constructing MORSTT Metagalaxy. Moreover, I do not think that obscenity has any place in a business letter.

If you have taken the trouble to inspect my latest work in ATTALA, you will see that it is, take it all for all, a beautiful job, and one that will go a long way toward holding back the fundamental chaos.

The only detail left to attend to is the matter of the impacted man. I fear I shall have to extract.

The flaw was hardening nicely, when he blundered into it again, tearing it worse than ever. No paradox as yet, but I can see one coming.

Unless he can control his immediate environment, and do it at once, I shall take the necessary step. Paradox is not *allowed.*

I consider it my duty to ask you to reconsider my bid for the MORSTT Metagalaxy project.

And I trust you will excuse me for bringing this oversight to your attention, but payment is still due.

Respectfully,
Carienomen

"So that's the story, Mr. Harf," Masrin said, an hour later. "I know how weird it sounds; but you saw me disappear yourself."

"That I did," Harf said. Masrin went into the bathroom to hang up his wet clothes.

"Yes," Harf said, "I guess you disappeared at that."

"I certainly did."

"And you don't want the scientists to know about your deal with the devil?" Harf asked slyly.

"No! I explained about paradox, and—"

"Let me see," Harf said. He wiped

his nose vigorously. "Those carved clubs you said they had. Wouldn't one of those be valuable to a museum? You said there was nothing like it."

"What?" Masrin asked, coming out of the bathroom. "Listen, I can't touch any of that stuff. It'll result in —"

"Of course," Harf said, "I could call in some newspaper boys instead. And some scientists. I could probably make me a nice little pile out of this devil-worship."

"You wouldn't!" Kay said, remembering only that her husband had said something bad would happen.

"Be reasonable," Harf said. "All I want is one or two of those clubs. That won't cause any trouble. You can just ask your devil—"

"There's no devil involved," Masrin said. "You have no idea what part one of those clubs might have played in history. The club I take might have killed the man who would have united these people, and the North American Indians might have met the Europeans as a single nation. Think how that would change—"

"Don't hand me that stuff," Harf said. "Are you getting me a club or aren't you?"

"I've explained it to you," Masrin said wearily.

"And don't tell me any more about this paradox business. I don't understand it, anyhow. But I'll split fifty-fifty with you on what I get for the club."

"No."

"O.K. I'll be seeing you." Harf started for the door.

"Wait."

"Yes?" Harf's thin, spidery mouth was smiling now.

Masrin examined his choice of evils. If he brought back a club there was a good chance of starting a paradox, by removing all that the club had done in the past. But if he didn't, Harf would call in the newspapers and scientists. They could find out if Harf was speaking the truth by simply carrying him downstairs; something the police would do anyhow. He would disappear, and then—"

With more people in on it, a paradox would be inevitable. And all Earth might, very possibly, be removed. Although he didn't know why, Masrin knew this for a certainty.

He was lost either way, but getting the club seemed the simpler alternative.

"I'll get it," Masrin said. He walked to the staircase, followed by Kay and Harf. Kay grabbed his hand.

"Don't do it," she said.

"There's nothing else I can do." He thought for a moment of killing Harf. But that would only result in the electric chair for him. Of course, he could kill Harf and take his body into the past, and bury it.

But the corpse of a twentieth century man in prehistoric America might constitute a paradox anyhow. Suppose it was dug up?

Besides, he didn't have it in him to kill a man.

Masrin kissed his wife, and walked downstairs.

There were no savages in sight on the plain, although Masrin thought he could feel their eyes, watching him. He found two clubs on the ground. The ones that struck him must be taboo, he decided, and picked one up, expecting another to crush his skull any moment. But the plain was silent.

"Good boy!" Harf said. "Hand it here!" Masrin handed him the club. He went over to Kay and put his arm around her. It was a paradox now, as certainly as if he had killed his great-great-grandfather before he was born. "That's a lovely thing," Harf said, admiring the club under the light. "Consider your rent paid for the rest of the month—."

The club disappeared from his hand.

Harf disappeared.

Kay fainted.

Masrin carried her to the bed, and splashed water on her face.

"What happened?" she asked.

"I don't know," Masrin said, suddenly very puzzled about everything. "All I know is, we're going to stay here for at least two weeks. Even if we have to eat beans."

TO: CENTER
Office 41
ATTN: Asst Controller Miglese
FROM: Contractor Carienomen
SUBJ: MORSTT Metagalaxy
Sir:

Your offer of a job repairing damaged stars is an insult to my company and myself. We refuse. Let me point out my work in the past, outlined in the brochure I am enclosing. How can you offer so menial a job to one of CENTER'S greatest companies?

Again, I would like to put in my request for work on the new MORSTT Metagalaxy.

As for ATTALA Metagalaxy—the work is now completed, and a finer job cannot be found anywhere this side of chaos. The place is a wonder.

The impacted man is no longer impacted. I was forced to extract. However, I did not extract the man himself. Instead, I was able to remove one of the external influences on him. Now he can grow out normally.

A nice job, I think you'll admit, and solved with the ingenuity that characterizes all my work.

My decision was: Why extract a good man, when I could save him by pulling the rotten one beside him?

Again, I welcome your inspection. I request reconsideration on MORSTT Metagalaxy.

PAYMENT IS STILL DUE!

Respectfully,
Carienomen

Enclosed:
1 brochure, 9978 pages

THE END

An ASF Factual Article

THE TINIEST TIME TRAVELER

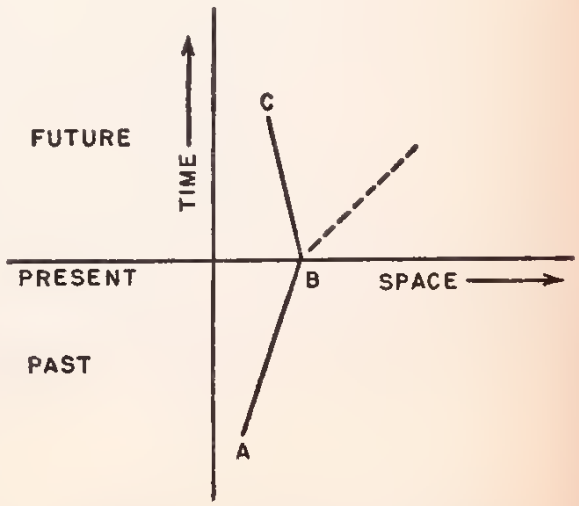
BY DAVID FOX

Time travel is an old idea in science fiction; this discusses a new physical theory which suggests that a positron is, in actual fact, an example of matter traveling backward in time—and of information from the future coming to the past! Problem: What kind of crystal causes maximum time-deflection of electrons? I want a crystal ball!

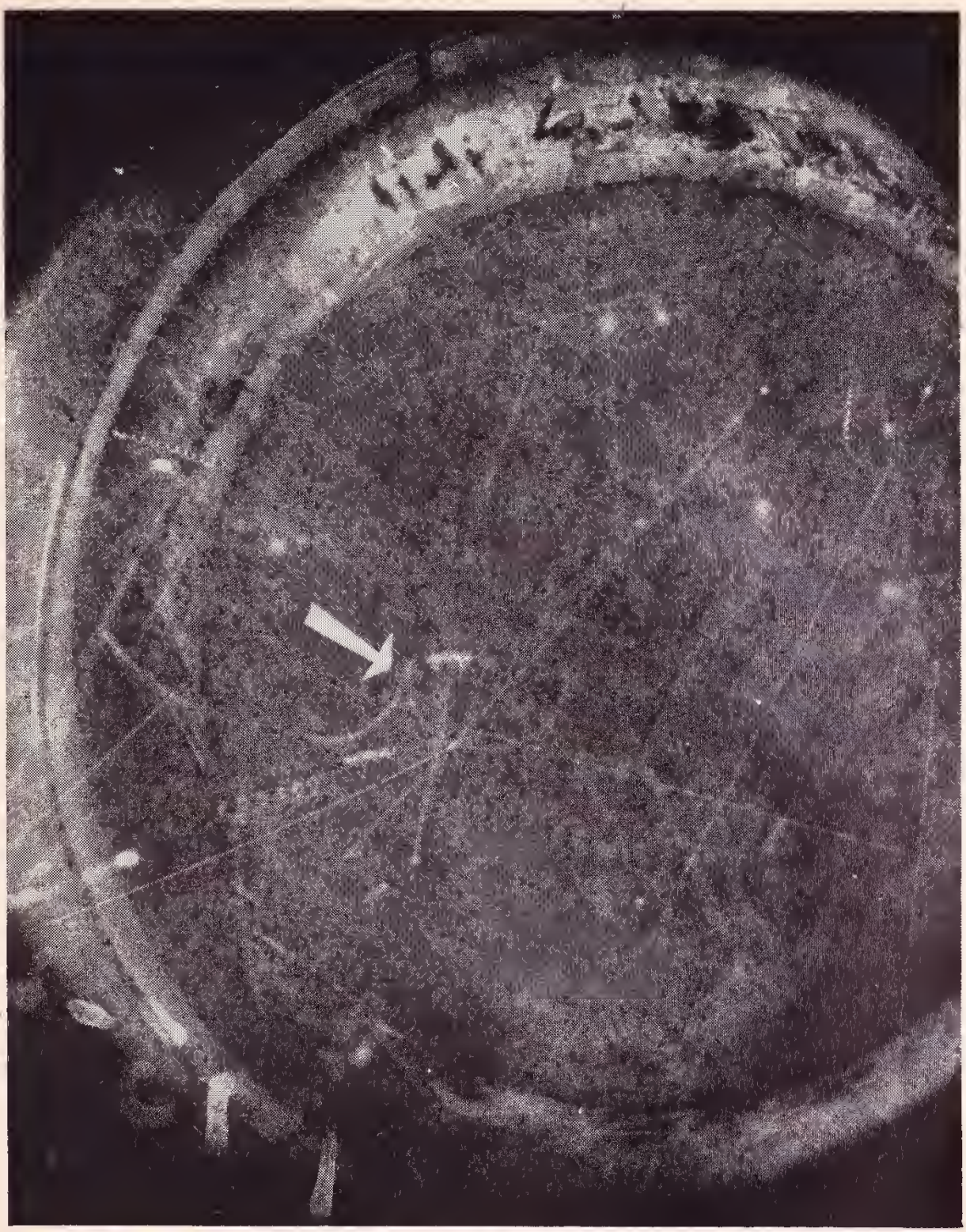
As Mark Twain said about the weather, everyone talks about taking a trip into the past, but nobody ever does anything about it.

Perhaps electrons have done something about it, though. Whether they have or not depends on one's point of view.

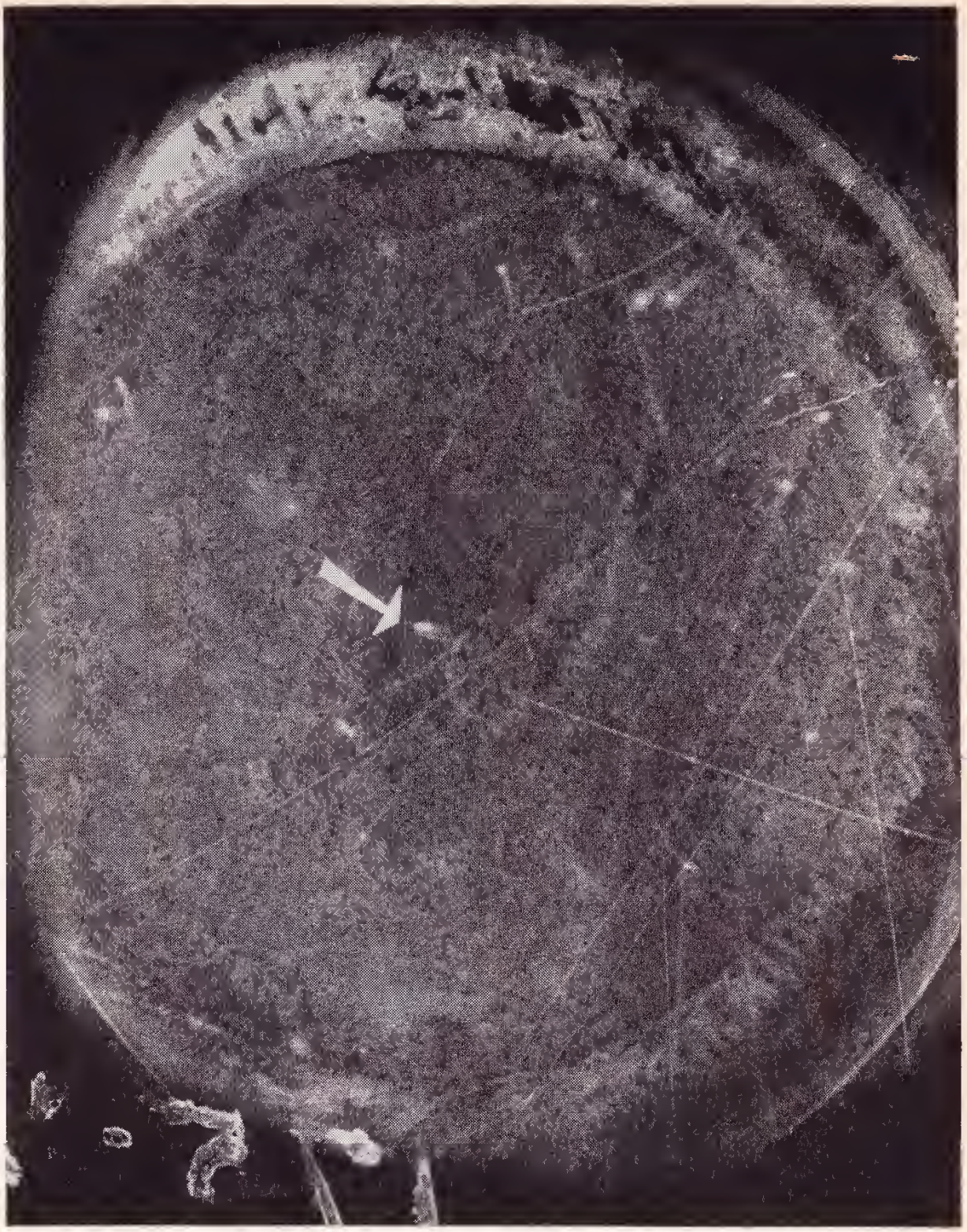
The conventional point of view is that both electrons and positrons move forward in time, in the sense that the direction from cause to effect is from past to future; an external influence on either particle affects its future his-



Emission af a photon by an electron.



These two photographs, from Brookhaven National Laboratories, are typical of the direct information we have about positrons. Ion tracks in a cloud chamber in a powerful magnetic field; the arrows point to the trace of an electron-positron incident. The two prints represent two views, at 90° angles, of one event. The



tightly waund spirals here and there indicate the paths of electrans traveling at lawer energies, their paths twisted inta tight knats by the pawerful magnetic field.

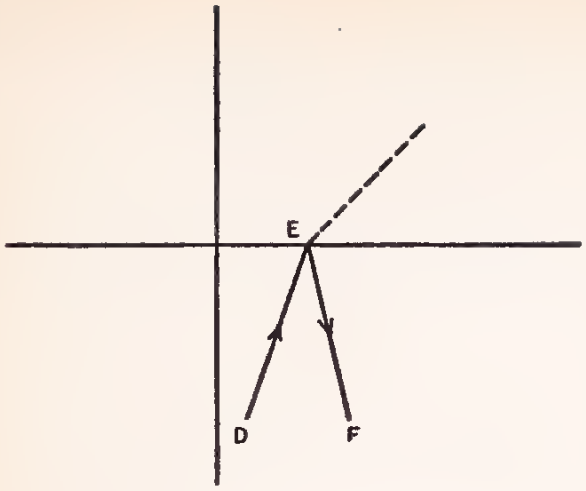


Fig. 2. Annihilation of on electron-positron poir.

tory, but not its past. Physicists implicitly made this assumption when using the original development of the Dirac theory of the electron to study processes in which electrons and positrons are involved.

It was shown by R. P. Feynman * that another approach is possible. An electron moving backwards in time would appear to us as a positron moving forwards in time. One can therefore treat all positrons as backward traveling electrons, with causality directed towards the past. A disturbance will affect the past history of the positron; information about the disturbance is transmitted towards the past. Using this interpretation, Feynman carried out a new development of the Dirac theory. He introduced no new mathematical postulates, so the theory is essentially the same as the original development, and the predictions of the results of experiments are unchanged, but the philosophical implications are very different.

There is nothing in Feynman's work that tells us how to build time machines, even in principle. The only practical purpose is to provide physicists with a simpler method of making certain complicated calculations. But the new viewpoint does lead to a greater insight into the space-time behavior of elementary particles.

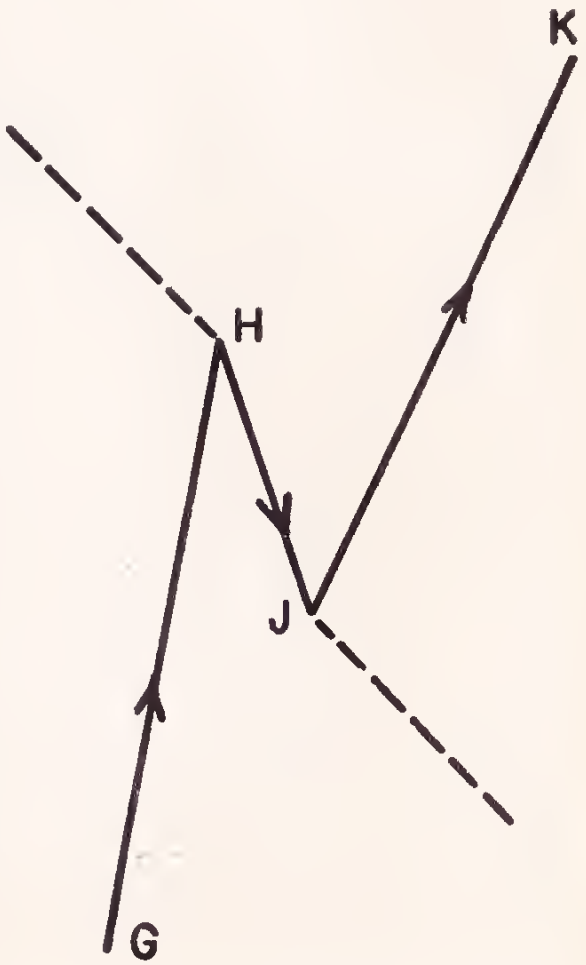


Fig. 3. Pair production followed by pair annihilotion.

* R. P. Feynman, *Physical Review 76*, 749, 769, (1949).

Protons and neutrons probably behave in the same way as electrons as far as time reversal is concerned. The analogues of the positron—"anti-electron"—are the antiproton and the antineutron. Neither of these particles has been detected as yet, but there is reason to believe that they exist—the same reason that led physicists to predict the existence of the positron before it was discovered. Adopting the new point of view, antiprotons and antineutrons may be treated as backwards traveling protons and neutrons, respectively.

Protons and neutrons are sometimes lumped together under the term "nucleons"; antiprotons and antineutrons may, therefore, be called "antinucleons".

Presumably, an "antiatom" could exist, with antinucleons in the nucleus and with positrons as the orbital particles. Such an atom would have a reversed time direction, according to the Feynman concept. Antimolecules could be built up from these antiatoms, and so forth.

Let's speculate about human time travel.

If a man traveled backwards in time, in the Feynman sense of the term, we would see all his electrons as positrons, his nucleons as antinucleons. Conversely, if we could create a man made up of antiatoms, he would travel backwards in time, again in the Feynman sense.

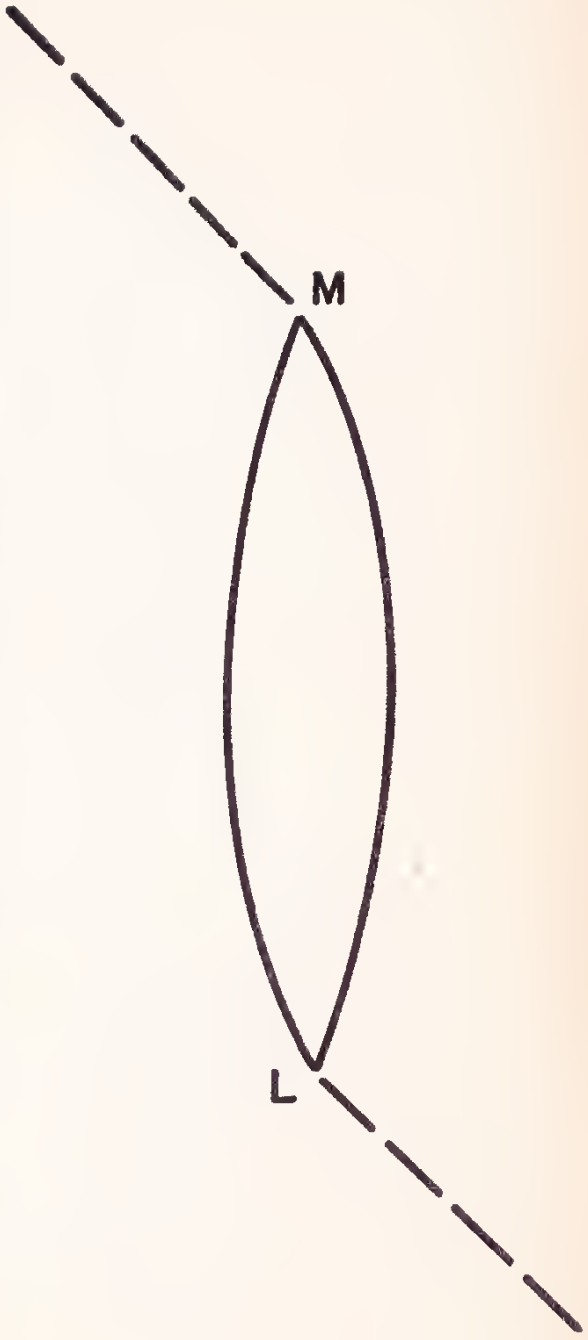


Fig. 4. Pair productian followed by annihilotion of the same pair.

Note that in speaking of the backwards travel of the antiman, the phrase "in the Feynman sense" is stressed. It would be nice to be able to say that our antiman would travel backwards in the biological sense: That he remembered the future and that he grew biologically older towards the past. But there is no reason to assume that this is so. There is too big a gap between our knowledge of elementary particle events and biological processes. More important, there is nothing in the mathematical theory of elementary particles that gives a time direction to causality or the transmission of information. The direction is implicit only in the point of view that is adopted. With our present knowledge, there is no more reason to use the Feynman approach to guess that our antiman and a normal man would travel in opposite time directions—biologically—than there is to use the conventional view to guess that they would travel in the same direction. Nor can both guesses be correct. For there is certainly an experimentally detectable difference between remembering the past and remembering the future, or between growing biologically older in one direction or the other.

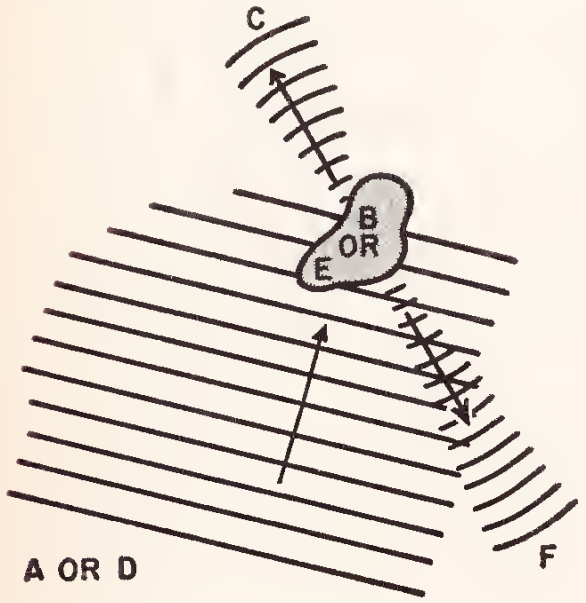


Fig. 5. Scattering of on electron wove forwords ond backwards in time. The labeling corresponds to that of Figures 1 and 2. However, the letters no longer correspond to shorply defined points.

Whatever our antiman would do about biological time travel, he would have to be careful to breathe air, eat food, and wear clothing made up of antiatoms. When a particle meets one of its antiparticles, the two annihilate one another and their mass-energy is transformed into the energy of electromagnetic or mesonic radiation. If the antiman breathed normal air, the particles of the air would annihilate his antiparticles. The resulting concentration of energy, in the form of photons and mesons, would make an atomic bomb look like a firecracker.

We can get a better picture of the reverse time travel concept if we take a look at a few elementary processes in which an electron takes part.

Figure 1 is a space-time diagram of the emission of a photon by an electron. Any point on the diagram represents a particular position in space at a particular time. The one-dimensional space axis actually represents

the three dimensions of space. The path of the electron in space and time is indicated by the solid line, the photon path by the dashed line.

An electron travels from the position and time corresponding to point A to a different position at a later time, point B. At B, because of a local disturbance not shown on the diagram, it emits a photon. Because it must supply the photon's momentum, the electron recoils, just as a gun recoils when it "emits" a bullet. The effect of the recoil is indicated on the diagram as a change of the direction of motion in space.

Now consider the process of the annihilation of an electron-positron pair, diagrammed in Figure 2. First, the conventional approach will be used to treat the positron motion. (The arrows along the paths have no meaning for this part of the discussion.) An electron starting at D and a positron starting at F move closer together as time goes on. At E, they meet and annihilate one another. The mass and kinetic energy of the pair are converted into the energy of a photon, which is created at E.

According to the Feynman point of view, the positron can be treated as an electron moving backwards in time. With this interpretation, we have a different picture of the pair annihilation process. An electron travels from D to E. At E, it emits a photon. Now, energy bears the same relationship to time as momentum does to space. Just as the photon's momentum, supplied by the electron, causes a recoil in space, so the emitted energy causes a "time recoil." In the case shown in

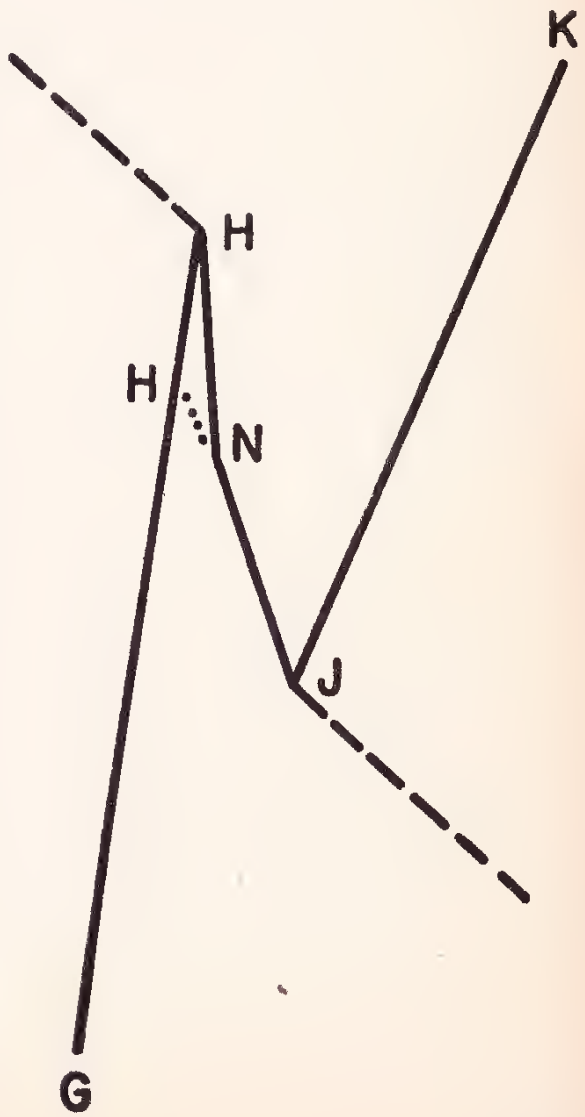


Fig. 6. Modification of Figure 3. An electric field at N deflects the positron so it meets the second electron at H' instead of at H. The dotted line NH shows the path taken in Figure 3, where there was no deflecting field.

Figure 2, the time recoil is large enough to reverse the time direction of travel, so that the *same electron* moves from E to the earlier point, F.

We see the same electron at two different places at the same time because it passes through that time twice. Once it passes through backwards, and therefore that part of the path would appear to us as the path of a positron moving forward in time.

With this description, the arrows have meaning. They show the direction of travel in space and time of the single particle. We can now treat pair annihilation as a special case of the emission of a photon by an electron. In Figure 1, the time recoil is not great enough to cause a time reversal; in Figure 2, it is.

There's something missing in what's been said so far. We can see what it is

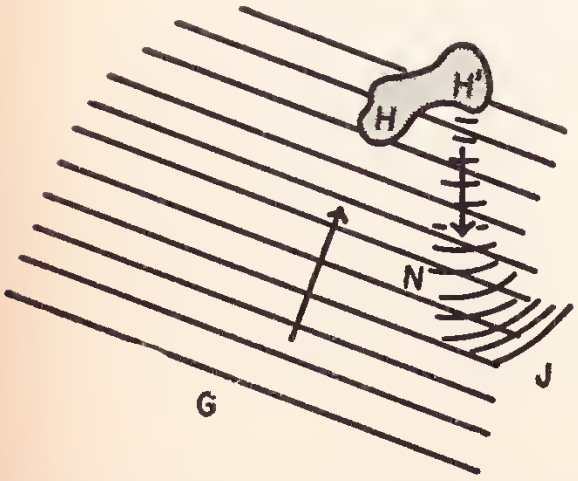


Fig. 7. Wave picture corresponding to portion of path GHH'NJ in Figure 6.

if we try to answer the question, "Which way does a road run?" We may establish a convention—"all roads lead *to* Rome"—but such a convention does not account for travel in both directions. When we speak of travel in either direction, we imply the existence of a variable that does not appear on an ordinary road map. Usually we take time as this additional variable. By comparing the variation of his position along the road with the variation of time, a traveler knows in which direction he is moving.

When time itself is a co-ordinate of the road map, we need another variable if we wish to consider travel in either direction. If a particle—or a man—travels backwards in time, it is at a later point first, at an earlier point last. The use of the words "first" and "last" implies that something besides time is changing; the additional variable increases as time decreases, so it cannot be time itself.

Some of the variables that may be used to determine the direction of time travel are the accumulation of memory and of historical records, and causality. Some authors of time travel stories have lumped these variables into what they call "psychological time". A man traveling backwards in time—say from E to F in Figure 2—would think of E as earlier than F—psychologically earlier—even though it is time-later. This gives backward time travel some meaning. The rest of

us would see him at F first, then at E; for us, psychological time would have the same direction as physical time.

An analogue of psychological time for the electron is the phase of its Dirac wave function.* Associated with each electron, and describing its behavior, is a wave. The phase of a wave motion designates the portion of the cycle of the wave; it is closely related to the angle in a circular motion.

The phase of an ordinary electron increases towards the future; the phase of a positron decreases in that direction. An electron traveling backwards in time would have a greater phase at an earlier time, just like a positron moving forwards in time. It can be shown that it is impossible to distinguish between these two situations.

The directions of the arrows in Figure 2 are the directions of increasing phase. Point E is phase-earlier than F, even though it is time-later. From D to E, there is the normal relationship between phase and time—"normal" only because there are very few positrons in the world compared to the number of electrons.

Now let's look at a more complicated process: Pair creation followed by pair annihilation (Figure 3). First from the conventional point of view: At J, a photon is annihilated and its energy goes into the creation of an electron-positron pair. (Pair creation is the reverse of the process of pair annihilation.) The electron goes off towards K, while the positron goes to H, where—and when—it meets another electron, which came from G. The positron and the second electron annihilate one another and produce a photon. Three particles are involved here—two electrons and a positron.

Feynman-wise, we can just follow the arrows, which point in the direction of increasing phase. Only one particle is involved. As far as the electron is concerned, its "phase clock" tells it that it is traveling from G to H to J to K. At H, it emits a photon and is kicked back in time; at J, it absorbs a photon and is kicked forward.

For an interval of time, we see three particles, because the electron makes three trips through that interval. To quote Feynman: "It is as though a bombardier flying low over a road suddenly sees three roads and it is only when two of them come together and disappear again that he realizes that he had simply passed over a long switchback in a single road."

There's another way in which this double process can take place (Figure 4). The annihilation is kept in the family. Instead of the positron bumping into some strange electron, the two particles that were created together at L are brought together again

* A better variable to use for this purpose is something called the "proper time" of the electron. However, it is easier to get a physical picture of the phase. The qualitative results are the same, whichever variable is used.

by some external force and annihilate one another at M, with the production of a photon. All this is from the conventional point of view.

Again we follow the arrows to see what the new interpretation leads to. An electron travels from L to M along the path on the right, emits a photon at M and is kicked back in time along the left-hand path, back to L where it absorbs a photon and recoils forward in time along the right-hand path to M, where it — et cetera. Although the cycle occurs only once on the space-time diagram, it goes on indefinitely from this point of view.

In order to create a pair, a photon must have an energy equal to the total mass-energy of the pair. For an electron-positron pair, the minimum energy is about a million electron volts, which is easily obtained with present day high energy accelerators. It requires billions of electron volts to create a nucleon-antinucleon pair. Energies of that order will be available from machines now under construction, such as the University of California's bevatron—named after the symbol bev: billion electron volts.

Nucleons interact much more strongly with meson fields than they do with the electromagnetic field. It is therefore likely that nucleon pairs will be created from mesons much more often than from photons. In Figures 1–4, the dashed lines may represent mesons, and the solid lines nucleons.

The comparison of phase-change with time-change is more than just a mathematical recipe for determining the direction of time travel. There is some connection with our intuitive ideas about moving backwards in time. This connection is based on the wave properties of the positron.

The description of electron motion used so far, in which the particle travels along well defined paths, is a crude one. It does not account for all the properties of the electron. A better description is obtained by considering the wave associated with the particle. The direction of motion of the wave is the direction of motion of the particle, but a definite path cannot be determined. Instead, we can only determine the probability of finding the particle at a given point in space-time; this probability is proportional to the intensity of the wave at that point.

An electron wave can be scattered in all space-time directions by a disturbance, just as a wave in a pond is scattered by an object at the surface of the water. Figure 5 is a diagram of such a scattering process. A wave strikes a disturbance represented by the shaded region and is scattered forward and backward in time. The disturbance may be due to the electromagnetic field associated with absorbed or emitted photons, or to some externally supplied field. For simplicity, the photon waves are not

shown, and only two small portions of the scattered wavelets are drawn.

Lines such as X-X are wave fronts —the successive crests of the wave, for example. The phase is the same all along any wave front, and it increases from one front to the next in the directions indicated by the arrows. The phase of an electron wave increases towards the future; the phase of a positron wave increases towards the past. The wave scattered by the disturbance towards F is, therefore, a positron—backwards-traveling electron—wave.

Figure 5 is the wave picture for both Figure 1 and Figure 2. The main wave—parallel straight lines—is associated with the portion of the path A to B in Figure 1, or D to E in Figure 2. When the electron reaches the disturbance, there is a certain probability that it will be deflected without undergoing a time reversal, as in Figure 1. This probability is determined by the intensity of the portion of the forward scattered wave shown in Figure 5. Similarly, the intensity of the backward scattered wave gives the probability that the electron will recoil backwards in time, as in Figure 2. The particles may also be deflected through other angles than those shown in Figures 1 and 2. These probabilities are given by the portions of the scattered wave that were omitted from Figure 5.

According to our intuitive ideas of causality, it is the disturbance that causes the back scattering to appear at F; that is, the direction of causality is reversed in time for the positron wave. This makes the idea of backwards time travel more than just a mathematical definition.

There's another way of looking at this picture. A change in the disturbance changes the intensity of the back scattering that reaches F. We can, therefore, think of the positron wave as transmitting information backwards in time from the disturbance to F. It could not transmit information from F to the disturbance; it would take a forward moving electron wave to do that.

The wave picture used in the conventional approach is considerably different. Implicit in the older viewpoint is the concept that *all* waves propagate towards the future, and consequently that information from a disturbance is always transmitted forward in time. Similarly, the direction from cause to effect is forward in time for all waves; the future develops continuously from the past.

We see then that the two approaches imply opposite time directions of causality or of the transmission of information in the case of positrons. It is not surprising when a new physical theory leads to a new philosophical interpretation of nature. However, Feynman's work is not a new theory; rather, it is a new interpretation of an older theory. No new postulates are made. As in the original

form of the theory, the Dirac equation for the electron wave function is taken as the starting point. The solution of the equation is carried out by a different method, consistent with the new approach.

Because the math is basically the same, the two interpretations must lead to the same predictions of the results of experiments. Therefore, there is no way of checking which point of view is correct. Perhaps a future modification of the theory, necessitated by new experimental findings, will be compatible with one but not the other viewpoint. In that case, we could tell which is the right approach. But it may be that all such modifications are compatible with both views, so that it is meaningless to ask which is correct.

In the meantime, we are faced with the fact that the same mathematical theory leads to two opposing points of view with opposite directions of causality and of time travel for the positron. This is not a contradiction because these directions are not implicit in the basic mathematical theory; they arise only from the point of view that is adopted.

This duality leads to an interesting paradox. In Figure 6, the situation shown in Figure 3 has been modified. An electric field at N deflects the positron before—time-earlier—it can reach H, so that the annihilation takes place at H' instead.

From the conventional point of view, there is nothing mysterious about the results. The electric field is applied time-earlier than H or H', so it can affect the annihilation process.

With the new interpretation, the situation is peculiar. With either approach, the same result must be predicted for any experiment. Yet it would seem as if the Feynman approach could not possiby predict the same result here. How does the electron know that it must wait until it reaches H' before it recoils? After all, the field at N is applied phase-later than H or H'. If the direction of transmission of information is the same as the direction of increase of phase, how can the field at N affect the phase-earlier parts of the path?

Furthermore, the field is turned on phase-earlier than J. It would seem as though a strong enough field at N could prevent the pair creation from taking place at J. But the field is turned on time-later than J, after the annihilation has already taken place. Does this mean that we can change the course of past history? Obviously not, since the two viewpoints must give the same answer. But how can the Feynman approach lead to the same result, in view of the above discussion?

To answer these questions, we must abandon the oversimplified picture of the electron traveling along well defined paths and instead consider the wave properties of the motion.

Figure 7 is the wave picture that corresponds to the portion of the path GHH'N of Figure 6. Again only a small part of the scattered wave is shown, and the photon waves are omitted. If we introduce the electric field at N, we cannot say definitely that the time reversal will take place at H' instead of at H. Instead, the probability of its occurring at H is reduced and the probability of its happening at H' is increased. This corresponds to a change in the intensity of the wavelets scattered backward from H and from H'. The nature of the influence of N on H and H' has changed, as compared with the cruder description, but there is still an influence. The paradox is still not explained. How does the wave know when it is at H or H' that part of it will reach N, phase-later?

The answer lies in an important difference between Figures 6 and 7. In the incorrect picture of Figure 6, the electron does not pass through N until phase-later than H or H'. The wave, on the other hand, cannot be confined to a limited region of space-time. The main wave passes through N, phase-earlier than the disturbance at H. The field at N is also a disturbance that can scatter the main wave. Part of this scattered wave will reach H and H'. Since this scattering is from N to H or to H', the field at N sends information to the latter points; i.e., it can influence the conditions and therefore change the back scattering at those points.

The situation is much more complicated than this. For example, there may be several scatterings back and forth between N and H'. This multiple scattering provides additional information at H'.

All that has been shown so far is that what arrives at the shaded area is changed by the introduction of the field at N, and that therefore the back scattering from that area is also changed.

To show that these changes will lead to exactly the same results as would be obtained with the conventional view involves a complicated mathematical proof.

Similar reasoning leads to the conclusion that there is no difference between the two points of view in predicting the events at J. Nothing in the Feynman approach can lead to the possibility of changing the course of past history.

At least, until a new theory comes along.

THE END

THE REFERENCE LIBRARY

BY P. SCHUYLER MILLER

PARADISE SOUGHT

Utopian stories are, most readers would agree, one of the fundamental fields of science fiction. Science fiction, almost by definition, recognizes no boundaries to its speculation; man's societies are not excepted.

Science fiction, on the other hand, is by no means so generally accepted as a medium for utopian speculation. Why this is, we will discuss later—from one reader's point of view. At the moment, there are two excellent studies of utopian literature, published during the last year, which you should investigate.

The older of the two books was finished in 1948 and first appeared in England in 1950, after the author's death. "Journey Through Utopia," by Marie Louise Berneri (Beacon Press, Boston. 1951. 339 pp. $3.75) is also the more readable and broader of the two. However, it is in many ways complemented by "The Quest for Utopia," by Glenn Negley, Professor of Philosophy at Duke University, and J. Max Patrick, Associate Professor of English at Queens College (Henry Schuman, New York. 1952. 599 pp. $6.75).

"The Quest for Utopia" is fundamentally an anthology of utopias from Sir Thomas More in 1516 down to an unnamed student of one of the

authors in 1947. Classical utopias running back to 900 B.C.—the presumed date of Lycurgus' Spartan state, described centuries later by Plutarch—are discussed very briefly. On the other hand, Miss Berneri has excerpted and discussed these earlier utopian writings quite thoroughly, and has done likewise with several others which Negley and Patrick glossed over. The two books duplicate each other only in a relatively few obvious landmarks: More's "Utopia," Campanella's "City of the Sun," Bacon's "New Atlantis," De Foigny's "Terra Incognita Australis," Cabet's "Voyage to Icaria," Wells' "Modern Utopia," and Hertzka's "Freeland."

This must be said at once for the casual reader: these old utopias are for the most part deadly dull reading. But buried in them are more ideas for future or other-worldly societies than the writers of science fiction can use up in a long, long time.

In nearly twice the number of pages and a considerably larger book than "Journey Through Utopia," Negley and Patrick have offered by far the richer sample of utopian writing. Obviously they could not include all the text of the twenty-seven utopias sampled—representative excerpts are quoted, and other parts paraphrased. For good measure they have thrown in a list of one hundred sixteen "modern" utopias dating between Robert Pemberton's "The Happy Colony" of 1854 and George Orwell's "1984" to represent only the "better known" of the multitude of utopian writings of this century-long period available in English.

Negley and Patrick are also broader in their definition of utopian writing than is Miss Berneri. By their definition the acceptable utopia is (1) fictional, (2) descriptive of a particular state or community (which may, of course, be planetwide), and (3) based on the political structure of that fictional state. They admit to their classification both the positive utopias, which hold up a model for human society to emulate, and the satires or negative utopias—"dystopias"—which depict—as in Huxley's "Brave New World" or Orwell's "1984"—a model to be avoided.

Miss Berneri, on the other hand, accepts only the positive utopia, though she recognizes the importance of the negative type. She would open her arms to the sheer fantasies of Rabelais and Cyrano de Bergerac: Negley and Patrick have no use for them.

"The Quest for Utopia" opens with a general discussion of utopias, then follows with a section of modern utopias of the last century (1850–1950). Of those excerpted, only Ignatius Donnelly's "Caesar's Column," Bellamy's "Looking Backward" (which sold half a million copies!), and Wells' "A Modern Utopia" are likely to be familiar to the casual science-fiction reader: the book offers

eight others. There is a flash-back to a brief discussion of classical utopias; an excerpt from Sir Thomas More; another brief commentary on the utopian literature of 1500–1850; and finally a section of fifteen selections from books of the latter period. Here More, Bacon's "New Atlantis," and perhaps Campanella's "City of the Sun" and Ludwig Holberg's "Niels Klim" will be familiar—the latter thanks to August Derleth's historical anthologies, "Beyond Time and Space" and "Far Boundaries."

The book closes with a chapter on "Contemporary Utopian Thought" for which Professor Negley claims primary responsibility. In it he comments:

"The once diverting and often suggestive field of utopian fantasy has been exploited, perhaps under the comic-book influence, into a bastard literary device known as 'science fiction.' This product bears about the same resemblance to utopian speculation that the tales of Horatio Alger bore to the economic theories of Adam Smith." And a little later: "Contemporary utopian fantasies are more likely to reflect literary skill than profound social or political significance. In fact, utopia has today become a device or vehicle available for purely literary purposes."

Ironically, Negley and Patrick mention among their modern utopian novels Stanton A. Coblentz's "The Sunken World" (Fantasy Publishing Co., Inc., 1948) which originally appeared in *Amazing Stories Quarterly*, and they quote from the new edition of "Equality; or A History of Lithconia," the first American utopian novel (1802), published in 1947 by a science-fiction house, Prime Press, which has also done an even handsomer edition of Mary Griffith's "Three Hundred Years Hence" (original publication 1836; Prime, 1950). These limited editions of American utopian novels should be known to every scholar.

The Negley-Patrick attitude aside, for the moment, Miss Berneri's book will probably be of greater interest to the average reader though it offers a less rich sample of actual utopian writing. It is most valuable for the running commentary which accompanies the excerpts and shows them in relation to the thought of their times and the lives and personalities of their writers. Negley and Patrick have prefaced each selection with lengthy biographical sketches of the authors, and have a number of general chapters, but theirs is not the clear and unified picture of "Journey Through Utopia." That Miss Berneri was not entirely blind to science fiction is shown by the fact that she cites Jack Williamson's ". . . And Folded Hands" *not* the book version, "The Humanoids," which did not appear until after her death. It is unfortunate that she did not live to give us her more generous opinion of the place of

science fiction in the scheme of utopian literature.

To return to the Negley-Patrick criticism of our "bastard literary device," science fiction. By their definition they are probably right. Utopian writing, as they see it, is above all deadly serious. ("The sheer fantasy . . . is of no utopian interest.") Its writers—e.g. Campanella—have wound up in jail or on the torture rack for their outrageous suggestions. James Harrington wanted Cromwell to use his "Oceana" as a model for a new England. Theodor Hertzka's "Freeland" was nearly translated into an utopian colony in East Africa; Etienne Cabet's "Voyage to Icaria" launched a series of "Icarian" colonies in America, headed by the author himself. The last of these fell victim to its own prosperity in 1898.

Traditional utopian novels have commonly incorporated plots or romances of one sort or another, and these have commonly been dismal failures by present-day standards. Your normal utopia stands still in its tracks while the innermost workings of the society are explained. This failing, may I submit, has survived in typical science fiction down to pretty recent times—certainly into the '30s. It is one of the readily acknowledged flaws in "Genus Homo" that Messers de Camp and Miller followed the utopian rather than the science-fiction tradition and explained the gorilla society instead of showing it in action.

Science fiction—good modern science fiction—must, on the other hand, tell a story. If it deals with societal variations, as it does more often than not these days, it must do so subtly, by showing how the imagined or projected society reacts upon the people who are a part of it or who intrude on it. And that, I submit, is a good deal harder and calls for a good deal more writing ability than preaching a sermon on how to change the world. Nor, judging from some of the samples offered by Negley and Patrick, is the science-fiction writer's imaginary society much less logical or attractive than the assorted dictatorships from Plato to More and on down the line to "1984."

But, you may protest, a great many of the reforms suggested in utopian literature have been put into practice—and often because of thought, discussion, and action stirred up by the book. Right—and for that very reason science fiction is happy to welcome utopian writing into its genre, dull as the stuff may be to read. But the scientific predictions of utopia have generally not been so successful—though More imagined incubators to take the place of setting hens, and Francis Bacon went overboard with more and more wondrous gadgets than you'd find anywhere outside of science fiction.

Let's look at it this way. Just about

everyone feels he—or she—understands human nature and human society. We're all human, aren't we? We know what we like, don't we? And by the same token, we all feel we're competent to cuss out the government or someone's else government or human society in general. If we have the time we're quite capable of writing up a utopian outline of our own.

On the other hand, by no means everyone is willing to admit to an understanding of science or what it may lead to. Fresh out of an agricultural era, we're sometimes rather proud of the fact that we don't know what goes on under the hood or behind the television screen.

Basically, intrinsically, it's a good deal harder to predict mechanical and scientific advances correctly than to guess how people will react. Nowadays, at least, we're working pretty close to the frontier of understanding and a hundred years ahead is a good deal farther than a thousand years seemed, a century ago.

On the other hand, it's practically a great deal harder to design a working society than to build a working machine. In terms of John Campbell's editorial in the September issue, in utopian thinking and writing we're likely to stick at the Wish step, or Wish plus one or both Speculations, whereas in science—and science fiction—we keep right on going to Production.

The critic, literary or social, feels himself qualified to judge the validity of utopian ideas. Doesn't he have a deep understanding of humanity? But he doesn't understand science and he can't appraise science fiction—not on its own terms, at least.

If utopias are again to be an influential part of our literature, their authors must be skilled novelists—Huxleys and Orwells, and more. Since the great novelists have understood men, they can if they will create utopias of significance for our future. But too few novelists understand science well enough to project it successfully or reasonably—and science must be a fundamental part of any future society.

Are we caught in a vicious circle then? Not entirely—and Marie Louise Berneri shows the way out better than Professors Negley and Patrick. If science fiction is to survive as literature, we all admit that its writers will have to gain stature as novelists—as students of humanity. When we have among us men and women who can project human society and science with equal authority and understanding, there may be a new era of utopias—and new worlds in which to test them.

☆ ☆ ☆ ☆ ☆

Some odds and ends of general interest have been accumulating far too long, and had better be tagged on now rather than go any longer. From time to time writers familiar in these

pages will crop up elsewhere in the literary news. When it's science fiction, I try to get hold of it and give you a report. When it isn't, I'll try at least to mention it. I hope that an archeological report in which I had a hand will be published some time during the next year, for example, by the New York State Museum—but that's extraneous.

Way last spring Dr. Joseph A. Winter published a book, "Are Your Troubles Psychosomatic?" (Julian Messner, New York. 222 pp. $3.50), which has had excellent reviews. I haven't seen it yet, but Frank G. Slaughter, physician and novelist, said in *The New York Times* recently: ". . . timely and well-written . . . something of a primer in the psychosomatic field. . . . Dr. Winter works up very gradually from the simplest concepts, things that everyone can understand because they are a part of everyday experience." Sounds good.

Isaac Asimov, biochemist at Boston University when he isn't tinkering with the Foundations, is co-author of a textbook for medical students, "Biochemistry and Human Metabolism." I haven't seen it, either, and not knowing the co-author or authors haven't been able to locate it in the usual bibliographical references—which lag several months behind publication dates. Reports are that a pretty complex subject has been made readable and understandable to anyone with standard college chemistry.

The new sixth edition of Mentor's "Good Reading" (New American Library, 35¢) has a section on science fiction by Professor J. O. Bailey of the University of North Carolina. He's been reading since his "Pilgrims Through Space and Time" appeared; but he hasn't discovered that most of Wells is back in print from Dover Publications.

And a few weeks ago a form letter caught up with me in Pittsburgh announcing the organization of Science-Fantasy Writers of America by a California group who got together in a bull session last June. The organization hopes to do for science fiction and fantasy writing what the mystery Writers of America have done for the mystery story. Since Anthony Boucher is a power in both organizations, chances are the SFWA is off to a good start. Among the other charter members: A. E. van Vogt, Jack Williamson, Fredric Brown, Ray Bradbury, Cleve Cartmill. Forrest J. Ackerman, at 915 South Sherbourne Drive, Los Angeles 35, California is Secretary pro tem.

Next month the basic library poll. Lists are still coming in.

ROBOTS HAVE NO TAILS . . . by Lewis Padgett. Gnome Press, New York. 1952. 224 pp. $2.75

In these days of the sociological trend in science fiction it is a relief to find occasional stories which are just

plain fun—fun to read, and obviously fun to write. When such stories do turn up, it is likely that Henry Kuttner, in the wry guise of "Lewis Padgett," is involved.

Here are the Gallegher stories from these ultra-serious pages, neatly assembled between covers with a portrait of Galloway Gallegher and a Gallegher gadget on the jacket. I am rather sorry that the gadget in question is not that "Proud Robot" of the opening story, name of Joe, but we can't have everything.

Five stories which appeared here between 1943 and 1948 have been assembled in a somewhat different order from that in which you first read them. Gallegher, you recall, is the subconscious genius who can't generate unless he is plastered—then, sober, has to retrieve his fortunes from the resulting shambles. In "The Proud Robot" he creates Joe, the robot with a Narcissus complex. Then "Gallegher Plus" finds him with a machine that eats back yards. Presently three Lybblas from Mars try to enlist his aid in conquering the world, and we are simultaneously introduced to Grandpa from Maine. In "Ex Machina" Gallegher acquires a blue-eyed generator and a tantalizing brown animal which steals his beer, and loses Grandpa and a client. And in "Time Locker" the villain meets a sticky end in a unique way.

Pure entertainment, lavishly supplied.

THE MIXED MEN, by A. E. van Vogt. Gnome Press, New York. 1952. 223 pp. $2.75

This story of extragalactic roving was distinctly minor van Vogt when it first appeared here in 1943–45 as three connected stories, and it still is.

It is the story of the colossal warship *Star Cluster*, sent by the Earth empire to map the Greater Magellanic Cloud. There, just as its commander, the Right Honorable Gloria Cecily, Lady Laurr of Noble Laurr, Grand Captain and what have you, is finishing a routine task she bumps into a weather station of the Fifty Suns—a federation sprung from Earth of fifteen thousand years before, and lost like a needle among the millions of suns of the Cloud. She must find those fifty suns—and doing it, mixes into the three-way conflict among their people, the Dellians, the non-Dellians, and the Mixed Men.

This is—I should almost say "of course"—a superman story. Maltby, hereditary leader of the Mixed Men, has among other things two minds and very unusual powers in each of them. In a parlous position in the Fifty Suns, he must nevertheless take on the Lady Laurr, and great is the ensuing carnage. Shipwrecked by a space-storm—a fruitful van Vogtian concept—cast away on a planet of a remarkable sun, married and unmarried—seemingly without ruffling a Dellian hair—slaughtered and reassembled, he still isn't very convincing

and there's a distinct inclination to say, "So what?" Seems to me the pieces carried more punch than the whole, which is way, way out of the class of "Slan," "Null A," and the "Weapon Shops."

DESTINATION: UNIVERSE! by A. E. van Vogt. Pellegrini & Cudahy, New York. 1952. 295 pp. $3.00

You can precipitate an argument at any fan convention, any time at all, by making the dogmatic statement that A. E. van Vogt's niche in the science-fiction hall of fame is as a novelist—"Slan," "World of Null A," "Weapon Shops"—or, conversely, a short-story writer—"Far Centaurus," "Black Destroyer," et cetera. To date there has been only one volume, FPCI's "Out of the Unknown" (a joint collection with E. M. Hull—Mrs. v.V.) plus innumerable anthology selections to bolster the anti-novelists. Now, in the first of two or three books of shorts which Pellegrini and Cudahy are making out of the long-expected Arkham House "Away and Beyond," the world-twister comes to the aid of the short-story enthusiasts.

"Destination: Universe!" might be taken as an alternate title for the first of the ten stories in the book, the unforgettable and unforgotten "Far Centaurus." The twist-upon-a-twist was scarcely needed in this story of the way Man's culture passed Man by. Yet, in their own ways, the Ganae of "The Monster," the Iilah of "Dormant," Bill Jenner in "The Enchanted Village," Skander of "Dear Pen Pal," or the Yevd in "The Sound" have declared their ultimate destination to be the universe, and nothing less. The Rulers, who give their title to another tale, have already staked out their claim to one corner of the universe over a span of five millennia. And in the concluding story, "The Search," Drake and the Possessors are extending their control over not alone one universe but an infinity of them. In that short of short-shorts, "Defense," an old culture and a young one pass each other on their ways to different but ironically identical destinations.

This leaves us only "A Can of Paint" to bear out August Derleth's contention that van Vogt is concerned with nothing but his story. This is the whimsical science-fiction puzzle-yarn in one of its best incarnations. What *would* an ideal can of paint be like—and once you had it, how would you get rid of it? If you don't remember—for six of the ten stories appeared here in ASF between 1942 and 1949—buy "Destination: Universe!" and find out—and while you're at it, reserve a copy of the next chunk of "Away and Beyond" to come from the Pellegrini & Cudahy presses. It's too bad that the current insanity in printing costs kept this from being another Arkham House giant, but the result will be two or three "bests" instead of one.

THE CURRENTS OF SPACE

BY ISAAC ASIMOV

Third of three parts. *The currents of Man's spatial politics are one thing; the blind currents of Nature, however, react neither to pleading, anger, or human willfullness. But willful men will still try . . .*

Illustrated by van Dongen

Synopsis

This is the story of three political groupings in the human-occupied galaxy of the future:

1. Trantor, *ruler of half the inhabited worlds of the galaxy and aspiring to establish a Galactic Empire which will bring peace and prosperity to the warring star systems, is particularly interested in*

2. Florina, *an impoverished, peasant world which, nevertheless, is the only source in all the galaxy for the miracle textile,* kyrt. *The* kyrt *trade is the richest single traffic in the galaxy and is under the exclusive control of a planet near Florina which is called*

3. Sark. *For centuries Sark has held Florina in a firm and ruthless grip, draining it of its best men and keeping it ground under a tyranny. Sark is able to do this because of two institutions: the Patrollers and the Townmen. The Patrollers are a police force composed of alien mercenaries, neither Sarkite nor Florinian. The Townmen are Florinian natives who in turn for certain privileges act as subordinate officials over Florinian towns on behalf of the Sarkite absentee landlords, or "Squires."*

In addition, there is the nonpolitical, scientific body, the Interstellar Spatioanalytic Bureau—also known as the I.S.B.—whose function it is to analyze the elementary composition of the extremely rarefied matter in the galactic reaches between the stars. At the time, the story opens, Selim Junz, a high official in the I.S.B. has been searching for nearly a year for a missing spatioanalyst, whose last received message was an emergency call stating that he knew of a

vast danger of galactic proportions hanging over Florina, and demanding instant consultation with the I.S.B. The spatioanalyst is never heard of again.

Junz suspects that Sark has imprisoned or murdered the spatioanalyst to prevent his story from getting out since they want nothing to interfere with the smooth functioning of the kyrt *trade. Junz does not seriously concern himself with such stories of danger from a spatioanalyst, since those persons are notoriously neurotic and unstable as otherwise they would not fear planets so much nor be so willing to spend long months in isolation in space in the course of their duties. Most spatioanalysts come from Earth, a planet with a radioactive crust, and hence one which breeds insecurities among its people.*

Junz enlists the aid of Ludigan Abel, Trantorian ambassador to Sark. Together they arrange that all spatioanalytic texts in Sarkite libraries be placed on reserve and any non-Sarkite requests for permission to see them be reported to them.

Meanwhile, on the planet Florina, interest centers about a "half-wit" known as Rik. A year earlier he had been found on the outskirts of a village in a state of complete mindlessness. Valona March, a local peasant girl and Myrlyn Terens, the local Townman, take charge of him.

Slowly his brain heals. When he suddenly remembers how to talk, the frightened Valona secretly takes him to a city doctor who recognizes Rik's symptoms to be the result of a psycho-probing. A psycho probe is an instrument that can be used to mold or destroy a mind and is usually used on criminals or psychopaths. Before the doctor can report this, he dies in a traffic accident.

Later, Rik begins remembering dim facts about his early life. Terens, the Townman, decides to follow this up by taking him to the library in Upper City. (The chief city on Florina is divided into a Lower and Upper City. The Upper City is exclusively Sarkite, but Townman privileges enable Terens to set foot on it.)

In the library, Rik consults an encyclopedia and recalls as a result that he was once a spatioanalyst. An attempt to consult spatioanalytic texts, however, results in their being stopped by the librarian and kept from leaving the library by a Patroller. However, Valona March, who has grown to love Rik, follows the two in her anxiety for his safety, first to the city, then to the library. She knocks down the Patroller.

Since this is a serious crime, there is nothing to do but flee, with a Patroller squad-car in pursuit. They are saved at the last minute by a Florinian inhabitant of Lower City, called the Baker, who hides them by leading them through a dummy oven to hidden rooms. This Baker, as it turns out, is a Trantorian agent.

The Townman suspects this and since he is a Florinian patriot as a result of experiences on Sark at the time of his education, he fears Trantorian domination as much as he fears Sarkite domination. He therefore escapes, assuring Valona that he will return. At the outskirts of the city, in the early dawn hours, the Townman enters a local precinct station, kills the lone Patroller in charge and puts on the Patroller's uniform.

Meanwhile, the Baker, having fitted Rik and Valona with new non-Florinian clothes, and an other-planet passport, is prepared to send them away from Florina to the safety of Trantorian territory. As they leave the bakery, however, the Townman, in his Patroller disguise, approaches and shoots down the Baker.

Rik and Valona do not recognize the Townman, however. In the belief that he is a Patroller, they run for it and in the confusion, escape. Rik, his memory continuing to return, is eager to get on board ship. He persuades Valona therefore to make for the spaceport, as had been the Baker's original plan, and there to stow away on any available ship. They do so. What they do not realize, however, is that the ship they choose is the same ship which is about to carry the Lady Samia of Fife back to Sark, that lady being the daughter of the most powerful landowner on Sark, the Squire of Fife.

The Townman, in his Patroller disguise, pursues Rik and Valona to the spaceport but is too late to prevent their stowing away. He learns of the fact that the ship carries the Lady Samia and he

makes up his mind to get to Sark at any cost. For one thing his life is forfeit on Florina, for another, he knows that Rik with his dimly remembered spatioanalytic past and his babblings of danger to Florina may be a vital weapon against the Sarkite dominance over Florina, and he must, therefore, get him back.

The Townman makes his way back to Upper City, still as a Patroller. He knows he cannot keep this disguise since, by now, the true Patrollers must know of the impostorship. He therefore manages to kill a Squire and exchange clothing. Now, as a Squire, he makes his way to one of the space-yacht ports that ring Upper City where the Squire killed by the Townman owns a yacht. The Townman would gladly use this yacht to escape from Florina but he hasn't the slightest notion of how to pilot one. He is trapped.

On board the Lady Samia's ship, meanwhile, Rik and Valona are quickly detected, since their body-heat registers on the ship's instruments. The Lady Samia, who feels kindly, in a condescending way, toward Florinians, cross-examines them at length, despite the conviction of the captain of the ship that Rik and Valona are dangerous criminals. The captain's point of view is borne out by a message from the Department of Security—Depsec—of Sark to the effect that it is known he has stowaways on board and that the stowaways are to be delivered to Depsec upon arrival at Sark.

Meanwhile, great doings are taking place on Sark. While the routine administration of Sark is in the hands of a celibate Florinian civil service, the big wheels are the "Great Squires," each of whom is absolute lord of a separate Sarkite continent. The most powerful of the Great Squires is the Squire of Fife, the Lady Samia's father, who one year before had called one of the rare meetings of all five Great Squires. At the time, blackmailing letters had been received by all Squires and Fife had connected this with the recent disappearance of a spatioanalyst. He believed that this marked the beginning of a campaign by Trantor to undermine Sarkite sovereignty on Florina and to take over control of the kyrt *trade.*

However, a year had passed in which nothing had happened to strengthen Fife's theory, until the disturbances, centering about Rik, began on Florina. A second meeting of Squires resulted. Fife outlined a theory tending to prove that Rik was the missing spatioanalyst, that someone had kidnaped and psycho-probed him, and had then hidden him on Florina to await a proper time for using him further. Fife then proceeded to claim that no one on Sark had the power to so manipulate the spatioanalyst except one of the Great Squires and therefore accused some one of his listeners—exactly which one he could not say—as a traitor to Sark. He announces that he is taking over complete control of all the continents on Sark and will thenceforward be sole manipulator of the kyrt *trade.*

The other Great Squires protest vehemently, claiming the entire story to be a

fraud. Fife stuns them into silence by announcing that the spatioanalyst is on board a Sarkite ship and is now in his hands. He also announces that the Townman whose activities have included the slaying of a Trantorian agent, two Patrollers and a Sarkite is also captured and on the way to Sark.

Now we must go back a few hours to the yacht-port at which the Townman, still uncaptured, is desperately haunting the yacht, belonging to the man he killed, which he cannot pilot.

PART 3

XIII.

The port's lights brightened evenly as the twilight deepened. At no time did the overall illumination vary from that to be expected of somewhat subdued late afternoon. At Port 9, as at the other yacht ports of Upper City, it was daylight throughout Florina's rotation. The brightness might grow unusually pronounced under the midday sun, but that was the only deviation.

Markis Genro could tell that the day proper had passed only because in passing into the port, he had left the colored night-lights of the city behind him. Those were bright against the blackening sky but they made no pretense of substituting for day.

Genro paused just inside the main entrance and seemed in no way impressed by the gigantic horseshoe with its three dozen hangars and five take-off pits. It was part of him, as it was part of any experienced yachtsman.

He took a long cigarette, violet in color and tipped with the flimsiest touch of silvery *kyrt*, and put it to his lips. He cupped his palms about the exposed tip and watched it glow to greenish life as he inhaled. It burnt slowly and left no ash. An emerald smoke filtered out his nostrils.

He murmured, "Business as usual!"

A member of the yacht committee, in yachting costume, with only a discreet and tasteful lettering above one tunic button to indicate that he was a member of the committee, had moved up quickly to meet Genro, carefully avoiding any appearance of hurry.

"Ah, Genro! And why not business as usual?"

"Hello, Doty. I only thought that with all this fume and fuss going on, it might occur to some bright boy to close the ports. Thank Sark it hasn't."

The committeeman sobered. "You know it may come to that. Have you heard the latest?"

Genro grinned. "How can you tell the latest from the next-to-the-latest?"

"Well, have you heard that it's definite now about the native—the killer."

"You mean they've caught him. I hadn't heard that."

"No, they haven't caught him. But they know he's not in Lower City."

"No? Where is he then?"

"Why, in Upper City. Here."

"Go on." Genro's eyes widened, then wrinkled in disbelief.

"No, really," said the committeeman, a little hurt, "I have it for a fact. The Patrollers are swooping up and down Kyrt Highway. They've got City Park surrounded and they're using Central Arena as a co-ordination point. This is all authentic."

"Well, maybe." Genro's eyes roved carelessly over the hangared ships. "I haven't been at 9 for two months, I think. Are there any new ships in the place?"

"No. Well, yes, there's Hjordesse's *Flame Arrow*."

Genro shook his head. "I've seen that. It's all chromium and nothing else. I hate to think I'll have to end by designing my own."

"Are you selling *Comet V?*"

"Selling it or junking it. I'm tired of these late models. They're too automatic. With their automatic relays and trajectory computers, they're killing the sport."

"You know, I've heard others say the same thing," agreed the committeeman. "Tell you what. If I hear of an old model in good condition on the market, I'll let you know."

"Thanks. Mind if I wander about the place?"

"Of course not. Go ahead." The committeeman grinned, waved, trotted away.

Genro made his slow rounds, his cigarette, half-gone, dropping from one side of his mouth. He stopped at each occupied hangar, appraising its contents shrewdly.

At Hangar 26, he displayed a heightened interest. He looked over the low barrier and said, "Squire?"

The call was one of polite inquiry, but after a pause of several moments, he had to call again, a little more peremptorily, a little less politely.

The Squire who emerged to view was not an impressive sight. For one thing, he was not in yachting costume. Secondly, he needed a shave, and his rather repellent-looking skullcap was yanked down in a most unfashionable manner. It seemed to cover half his face. Lastly, his attitude was one of peculiarly suspicious over-caution.

Genro said, "I'm Markis Genro. Is this your craft, sir?"

"Yes, it is." The words were slow and tense.

Genro disregarded that. He tilted his head back and looked over the yacht's lines carefully. He removed what was left of his cigarette from between his lips and flicked it high in the air. It had not yet reached the high-point of its arc when, with a little flash, it vanished.

Genro said, "I wonder if you'd mind my coming in?" The other hesitated, then stepped aside. Genro entered.

He said, "What kind of motor does the craft carry, sir?"

"Why do you ask?"

Genro was tall, skin and eyes were dark, hair crisp and cut short. He topped the other by half a head, and his smile showed white, evenly-spaced

teeth. He said, "To be very frank, I'm in the market for a new ship."

"You mean you're interested in this one?"

"I don't know. Something like it, maybe, if the price is right. But anyway, I wonder if you'd mind my looking at the controls and engines?"

The Squire stood there silently.

Genro's voice grew a trifle colder. "As you please, of course." He turned away.

The Squire said, "I might sell." He fumbled in his pockets. "Here's the license!"

Genro looked at each side with a quick, experienced glance. He handed it back. "You're Deamone?"

The Squire nodded. "You can come in if you wish?"

Genro looked briefly at the large port-chronometer, the luminescent hands indicating the beginning of the second hour after sunset.

"Thank you. Won't you lead the way?"

The Squire rummaged his pockets again, and held out a booklet of key-slivers. "After you, sir."

Genro took the booklet. He leafed through the slivers, looking at the small code marks for the "ship stamp." The other man made no attempt to help him.

Finally, he said, "This one, I suppose?"

He walked up the short ramp to the air-lock balcony and considered the fine seam at the right of the lock carefully. "I don't see—Oh, here it is." And he stepped to the other side of the lock.

Slowly, noiselessly, the lock yawned and Genro moved into the blackness. The red air-lock light went on automatically as the door closed behind them. The inner door opened and as they stepped into the ship proper white lights flickered on over all the length of the ship.

Myrlyn Terens had no choice. He no longer remembered the time, long since, when such a thing as "choice" had existed. For three long, wretched hours, now, he had remained near Deamone's ship, waiting and helpless to do anything else. It had led to nothing till now. He did not see that it could lead to anything but capture.

And then this fellow came with an eye to the ship. To deal with him at all was madness. He could not possibly maintain his imposture at such close quarters. But then, he could not possibly remain where he was, either.

At least within the ship there might be food. Strange that that had not occurred to him before.

There was.

Terens said, "It's close to dinner time. Would you like to have something?"

The other had scarcely looked over his shoulder. "Why, later, perhaps. Thank you."

Terens did not urge him. He let him roam the ship and applied himself

thankfully to the potted meat and cellulite wrapped fruit. He drank thirstily. There was a shower across the corridor from the kitchen. He locked its door and bathed. It was a pleasure to be able to remove the tight skull-cap, at least temporarily. He even found a shallow closet from which he could choose a change of clothing.

He was far more master of himself when Genro returned.

Genro said, "Say, would you mind if I tried to fly this ship?"

"I have no objection. Can you handle this model?" asked Terens, with an excellent imitation of non-chalance.

"I think so," said the other, with a little smile. "I flatter myself I can handle any of the regular models. Anyway, I've taken the liberty of calling the control tower and there's a take-off pit available. Here's my yachtsman's license if you'd like to see it before I take over."

Terens gave it as cursory a glance as Genro had given his. "The controls are yours," he said.

The ship rolled out of the hangar like an air-borne whale, moving slowly, its diamagnetized hull clearing the smooth packed clay of the field by three inches.

Terens watched Genro handling the controls with fingertip precision. The ship was a live thing under his touch. The small replica of the field that was upon the visi-plate shifted and changed with each tiny motion of every contact.

The ship came to a halt, pin-pointed at the lip of a take-off pit. The diamagnetic field strengthened progressively towards the ship's prow and it began tipping upward. Terens was mercifully unaware of this as the pilot room turned on its universal gimbals to meet the shifting gravity. Majestically, the ship's rear flanges fitted into the appropriate grooves of the pit. It stood upright, pointing to the sky.

The duralite cover of the take-off pit slipped into its recess, revealing the neutrized lining, a hundred yards deep, that received the first energy thrusts of the hyperatomic motors.

Genro kept up a cryptic exchange of information with the control tower. Finally, "Ten seconds to take-off," he said.

A rising red thread in a quartz tube marked off the disappearing seconds. It made contact and the first surge of power tore backward.

Terens grew heavier, felt himself pressing against the seat. Panic tore at him.

He grunted, "How does it handle?"

Genro seemed impervious to acceleration. His voice had almost its natural timber as he said, "Moderately well."

Terens leaned back in his chair, trying to relax with the pressure, watching the stars in the visi-plate turn hard and bright as the atmosphere vanished from between himself and them. The

kyrt next to his skin felt cold and damp.

They were out in space now. Genro was putting the ship through its paces. Terens had no way of telling that first-hand but he could see the stars march steadily across the visi-plate as the yachtsman's long, slim fingers played with the controls as though they were the keys of a musical instrument. Finally, a bulky orange segment of a globe filled the visi-plate's clear surface.

"Not bad," said Genro. "You keep your craft in good condition, Deamone. It's small but it has its points."

Terens said, carefully, "I suppose you'd like to test its speed and its Jumping capacity. You may, if you like. I have no objection."

Genro nodded. "Very well. Where do you suggest we take ourselves? What about—" He hesitated, then went on, "Well, why not to Sark."

Terens breathed a little more quickly. He had expected that. He was on the point of believing himself to be living in a world of magic. How things forced his moves, even without his connivance. It would not have been difficult to convince him that it was not "things" but design that prompted the moves. His childhood had been steeped in the superstitions that the Squires fostered among the natives and such things are hard to outgrow. On Sark was Rik and his returning memories. The game was not over.

He said, wildly, "Why not, Genro?"

Genro said, "Sark it is then."

With gathering speed, the globe of Florina slanted out beyond the visi-plate's view and the stars returned.

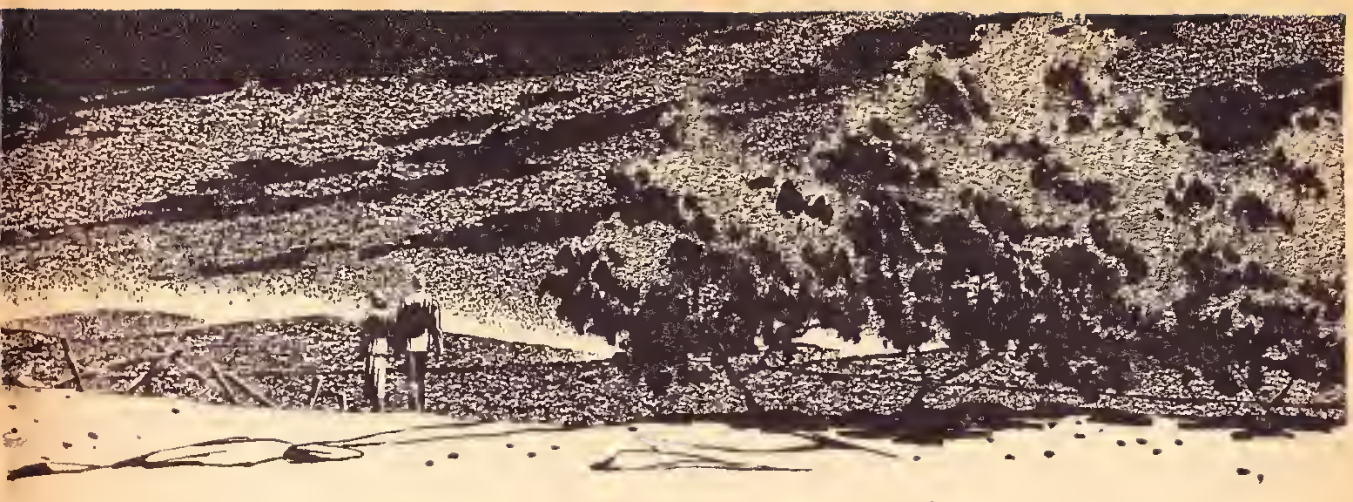
"What's your best time on the Sark-Florina run?" asked Genro.

"Nothing record-breaking," said Terens. "About average."

"Then you've done it in better than six hours, I suppose?"

"On occasion, yes."

"Do you object to my trying to



shave five?"

"Not at all," said Terens.

It took hours to reach a point far enough from star-mass distortion of the space fabric to make a Jump possible.

Terens found wakefulness a torture. This was his third night with little or no sleep and the tensions of the days had exaggerated that lack.

Genro looked at him askance, "Why don't you turn in?"

Terens forced an expression of liveliness on to his sagging facial muscles. He said, "It's nothing. Nothing."

He yawned prodigiously and smiled in apology. The yachtsman turned back to his instruments and Terens' eyes glazed over once again.

Seats in a space-yacht are comfortable by very necessity. They must cushion the person against accelerations. A man not particularly tired can easily and sweetly fall asleep upon them. Terens who could, at the moment, have slept on broken glass, never knew when he passed the borderline.

He slept for hours; he slept as deeply and as dreamlessly as ever in his life.

He did not stir; he showed no single sign of life other than his even breathing, when his skullcap was removed from his head.

Terens woke blearily, slowly. For long minutes, he had not the slightest notion of his whereabouts. He thought he was back in his Townman's cottage. The true state of affairs seeped back in stages, as it usually does. Eventually he could smile at Genro, who was still at the controls and say, "I guess I fell asleep."

"I guess you did. There's Sark." Genro nodded toward the large white crescent in the visi-plate.

"When do we land?"

"About an hour!"

Terens was awake enough now to sense a subtle change in the other's

attitude. It was an icy shock to him that the steel-gray object in Genro's hand turned out to be the graceful barrel of a needle-gun.

"What in Space—" began Terens, rising to his feet.

"Sit down," said Genro, carefully. There was a skullcap in his other hand.

Terens raised a hand to his head and his fingers found themselves clutching sandy hair.

"Yes," said Genro, "it's quite obvious. You're a native."

Terens stared and said nothing.

Genro said, "I knew you were a native before I ever got on poor Deamone's ship."

Terens' mouth was cotton-dry and his eyes burnt. He watched the tiny, deadly muzzle of the gun and waited for a sudden, noiseless flash. He had carried it so far, so far, and had lost the gamble after all.

Genro seemed in no hurry. He held the needle-gun steady and his words were even and slow.

"Your basic mistake, Townman, was the thought that you could really outwit an organized police force indefinitely. Even so, you would have done better if you hadn't made the unfortunate choice of Deamone as your victim."

"I didn't choose him," croaked Terens.

"Then call it luck. Alstare Deamone, some twelve hours ago, was standing in City Park, waiting for his wife. There was no reason, other than sentiment, for him to meet her there of all places. They had met in that very spot originally, and they met there again on every anniversary of that meeting. There's nothing particularly original about that sort of ceremony between young husbands and wives, but it seems important to them. Of course, Deamone did not realize that the comparative isolation of the spot made him an appropriate victim for a murderer. Who would have thought that in Upper City?

"In the ordinary course of events, the murder might not have been discovered for days. Deamone's wife, however, was on the scene within half an hour of the crime. The fact that her husband was not there astonished her. He was not the type, she explained, to leave in a fury because she herself was a trifle late. She was often late. He would more or less have expected that. It occurred to her that her husband might be waiting for her inside 'their' cave.

"Deamone had been waiting outside 'their' cave, naturally. It was the nearest one to the scene of the first assault, consequently, and the one into which he was dragged. His wife entered that cave and found . . . well, you know what she found. She managed to relay the news to the Patrol Corps through our own Depsec offices, although she was almost incoherent with shock and hysteria.

"How does it feel, Townman, to kill a man in cold blood, leaving him

to be found by his wife at the one spot most steeped with happy memories for them both."

Terens was choking. He gasped out, through a red mist of anger and frustration, "You Sarkites have killed millions of Florinians. Women. Children. You've grown rich out of us. This yacht—" It was all he could manage.

"Deamone wasn't responsible for the state of affairs he found at birth," said Genro. "If you had been born a Sarkite, what would you have done? Resigned your estates, if any, and gone to work in the *kyrt* fields?"

"Well, then, shoot," cried Terens, writhing. "What are you waiting for?"

"There's no hurry. There is plenty of time to finish my story. We weren't certain as to the identity of either the corpse or the murderer, but it was a very good guess that they were Deamone and yourself respectively. It seemed obvious to us, from the fact that the ashes next to the body were of a Patroller uniform, that you were masquerading as a Sarkite. It seemed further probable that you would make for Deamone's yacht. Don't overestimate our stupidity, Townman.

"Matters were still rather complex. You were a desperate man. It was insufficient to track you down. You were armed and would undoubtedly commit suicide if trapped. Suicide was something we did not wish. They wanted you on Sark and they wanted you in working order.

"It was a particularly delicate affair for myself and it was quite necessary to convince Depsec that I could handle it alone; that I could get you to Sark without noise or difficulty. You'll have to admit that is just what I'm doing.

"To tell you the truth, I wondered at first if you were really our man. You were dressed in ordinary business costume on the yacht-port grounds. It was in incredibly bad taste. No one, it seemed to me, would dream of impersonating a yachtsman without the proper costume. I thought you were being deliberately sent in as a decoy, that you were *trying* to be arrested while the man we wanted escaped in another direction.

"I hesitated and tested you in other ways. I fumbled with the ship's key in the wrong place. No ship ever invented opened at the right side of the air lock. It opens always and invariably at the left side. You never showed any surprise at my mistake. None at all. Then I asked you if your ship had ever made the Sark-Florina run in less than six hours. You said you had—occasionally. That is quite remarkable. The record time for the run is over nine hours.

"I decided you couldn't be a decoy. The ignorance was too supreme. You had to be naturally ignorant and probably the right man. It was only a question of your falling asleep—and it was obvious from your face that you

needed sleep desperately—disarming you and covering you quietly with an adequate weapon. I removed your hat more out of curiosity than anything else. I wanted to see what a Sarkite costume looked like with a sandy-haired head sticking out of it."

Terens kept his eyes on the whip. Perhaps Genro saw his jaw-muscles bunch. Perhaps he simply guessed at what Terens was thinking.

He said, "Of course, I must not kill you, even if you jump me. I can't kill you even in self-defense. Don't think that gives you an advantage. Begin to move and I'll shoot your leg off."

The fight went out of Terens. He put the heels of his palms to his forehead and sat there, rigid as bone could make him.

Genro said, softly, "Do you know why I tell you all this?"

Terens did not answer.

"First," said Genro, "I rather enjoy seeing you suffer. I don't like murderers and I particularly don't like natives who kill Sarkites. I've been ordered to deliver you alive but nothing in my orders says I have to make the trip pleasant for you. Secondly, it is necessary for you to be fully aware of the situation since after we land on Sark, the next steps will be up to you."

Terens looked up. "What!"

"Depsec knows you're coming in. The Florinian regional office sent the word as soon as this craft cleared Florina's atmosphere. You can be sure of that. But I said it was quite necessary for me to convince Depsec that I could handle this alone and the fact that I have makes all the difference."

"I don't understand you," said Terens, desperately.

With composure, Genro answered, "I said 'they' wanted you on Sark; 'they' wanted you in working order. By 'they' I don't mean Depsec; I mean Trantor!"

XIV.

Selim Junz had never been the phlegmatic type. A year of frustration had done nothing to improve that. He could not sip wine carefully while his mental orientation sat upon suddenly trembling foundations. In short, he was not Ludigan Abel.

And when Junz had done with his angry shouting that on no account was Sark to be allowed freedom to kidnap and imprison a member of the I.S.B. regardless of the condition of Trantor's espionage network, Abel merely said, "I think you had better spend the night here, doctor."

Junz said, freezingly, "I have better things to do."

Abel said, "No doubt, man, no doubt. Just the same, if my men are being blasted to death, Sark must be bold, indeed. There is a great possibility that some accident may happen to you before the night is over. Let us wait a night then and see what comes of a new day."

Junz's protests against inaction came

to nothing. Abel, without ever losing his cool, almost negligent, air of indifference, was suddenly hard of hearing. Junz was escorted with firm courtesy to a chamber.

In bed, he stared at the faintly luminous, frescoed ceiling—on which glowed a moderately skillful copy of Lenhaden's "Battle of the Arcturian Moons"—and knew he would not sleep. Then he caught one whiff, a faint one, of the gas, somnin, and was asleep before he could catch another. Five minutes later, when a forced draft swept the room clean of the anaesthetic, enough had been administered to assure a healthful eight hours.

He was awakened in the cold half-light of dawn. He blinked up at Abel.

"What time is it?" he asked.

"Six."

"Great Space." He looked about and thrust his bony legs out from under the sheet. "You're up early."

"I haven't slept."

"What?"

"I feel the lack, believe me. I don't respond to anti-somnin as I did when I was younger."

"Well?" Junz asked. "Surely you don't wake through the night and rouse me at six unless you have something to tell me."

"You're right. You're right." Abel sat down on the bed just vacated by Junz and threw his head back in a laugh. It was high-pitched and rather subdued. His teeth showed, their strong, faintly-yellow plastic incongruous against his shrunken gums.

"I beg your pardon, Junz," he said. "I am not quite myself. This drugged wakefulness has me a little lightheaded. I almost think I will advise Trantor to replace me with a younger man."

Junz said, with a flavor of sarcasm not entirely unmixed with sudden hope, "You find they haven't got the spatioanalyst after all?"

"No, they do. I'm sorry but they do. I'm afraid that my amusement is due entirely to the fact that our nets are intact."

Junz would have liked to say, "Damn your nets," but refrained.

Abel went on, "There is no doubt they knew Khorov was one of our agents. They may know of others on Florina. Those are small fry. The Sarkites knew that and never felt it worthwhile to do more than hold them under observation."

"They killed one," Junz pointed out.

"They did not," retorted Abel. "It was one of the spatioanalyst's own companions in a Patroller disguise who used the blaster."

Junz stared. "I don't understand."

"It's a rather complicated story. Won't you join me at breakfast? I need food badly."

Over the coffee, Abel told the story of the last thirty-six hours.

Junz was stunned. He put down his

own coffee cup, half full, and returned to it no more. "Even allowing them to have stowed away on that ship of all ships, the fact still remains they might not have been detected. If you send men to meet that ship as it lands—"

"Bah. You know better than that. No modern ship could fail to detect the presence of excess body heat."

"It might have been overlooked. Instruments may be infallible but men are not."

"Wishful thinking. Look here. At the very time that the ship with the spatioanalyst aboard is approaching Sark, there are reports of excellent reliability that the Squire of Fife is in conference with the other Great Squires. These intercontinental conferences are spaced as widely as the stars of the galaxy. Coincidence?"

"An intercontinental conference over a spatioanalyst?"

"An unimportant subject in itself, yes. But we have made it important. The I.S.B. has been searching for him for nearly a year with remarkable pertinacity."

"Not the I.S.B.," insisted Junz. "Myself. I've been working in almost an unofficial manner."

"The Squires don't know that and wouldn't believe it if you told them. Then, too, Trantor has been interested."

"At my request."

"Again they don't know that and wouldn't believe it."

Junz stood up and his chair moved automatically away from the table. Hands firmly interlocked behind his back, he strode the carpet. Up and back. Up and back. At intervals, he glanced harshly at Abel.

Abel turned unemotionally to a second cup of coffee.

Junz said, "How do you know all this?"

"All what?"

"Everything. How and when the spatioanalyst stowed away. How and in what manner the Townman has been eluding capture? Is it your purpose to deceive me?"

"My dear Dr. Junz."

"You admitted you had your men watching for the spatioanalyst independently of myself. You saw to it that I was safely out of the way last night, leaving nothing to chance." Junz remembered, suddenly, that whiff of somnin.

"I spent a night, doctor, in constant communication with certain of my agents. What I did and what I learned comes under the heading of, shall we say, classified material. You had to be out of the way, and yet safe. What I have told you just now I learned from my agents last night."

"To learn what you did you would need spies in the Sarkite government itself."

"Well, naturally."

Junz whirled on the ambassador. "Come, now."

"You find that surprising? To be

sure, Sark is proverbial for the stability of its government and the loyalty of its people. The reason is simple enough since even the poorest Sarkite is an aristocrat in comparison with Florinians and can consider himself, however fallaciously, to be a member of a ruling class.

"Consider, though, that Sark is not the world of billionaires most of the galaxy thinks it is. A year's residence must have well convinced you of that. Eighty per cent of its population has its living standard at a par with that of other worlds and not much higher than the standard of Florina itself. There will always be a certain number of Sarkites who, in their hunger, will be sufficiently annoyed with the small fraction of the population obviously drenched in luxury, to lend themselves to my uses.

"It is the great weakness of the Sarkite government that for centuries they have associated rebellion only with Florina. They have forgotten to watch over themselves."

Junz said, "These small Sarkites, assuming they exist, can't do you much good."

"Individually, no. Collectively, they form useful tools for our more important men. There are members even of the real ruling class who have taken the lessons of the last two centuries to heart. They are convinced that in the end Trantor will have established its rule over all the galaxy; and, I believe, rightly convinced. They even suspect that the final dominion may take place within their lifetimes, and they prefer to establish themselves, in advance, on the winning side."

Junz grimaced. "You make interstellar politics sound a very dirty game."

"It is, but disapproving of dirt doesn't remove it. Nor are all its facets unrelieved dirt. Consider the idealist. Consider the few men in Sark's government who serve Trantor neither for money nor for promises of power but only because they honestly believe that a unified galactic government is best for humanity and that only Trantor can bring such a government about. I have one such man, my best one, in Sark's Department of Security, and at this moment he is bringing in the Townman."

Junz said, "You said he had been captured."

"By Depsec, yes. But my man is Depsec *and my man.*" For a moment, Abel frowned and turned pettish. "His usefulness will be sharply reduced after this. Once he lets the Townman get away, it will mean demotion at the best and imprisonment at the worst. Oh, well!"

"What are you planning now?"

"I scarcely know. First, we must have our Townman. I am sure of him only to the point of arrival at the spaceport. What happens thereafter—" Abel shrugged, and his old, yellowish skin stretched parchmentlike over his cheekbones.

Then he added, "The Squires will be waiting for the Townman as well. They are under the impression they have him, and until one or the other of us has him in our fists, nothing more can happen."

But that statement was wrong.

Strictly speaking, all foreign embassies throughout the galaxy maintained extraterritorial rights over the immediate areas of their location. Generally, this amounted to nothing more than a pious wish, except where the strength of the home planet enforced respect. In actual practice, it meant that only Trantor could truly maintain the independence of its envoys.

The grounds of the Trantorian Embassy covered nearly a square mile and within it armed men in Trantorian costume and insignia maintained patrol. No Sarkite might enter but on invitation, and no armed Sarkite on any account. To be sure, the sum of Trantorian men and arms could withstand the determined attack of a single Sarkite armored regiment for not more than two or three hours, but behind the small band was the power of reprisal from the organized might of a million worlds.

It remained inviolate.

It could even maintain direct material communication with Trantor, without the need of passing through Sarkite ports of entry or debarkation. From the hold of a Trantorian mother-ship, hovering just outside the hundred-mile limit that marked off the boundary between "planetary space" and "free space," small gyroships, vane-equipped for atmospheric travel with minimum power expenditure, might emerge and needle down—half-coasting, half-driven—to the small port maintained within the Embassy grounds.

The gyroship which now appeared over the Embassy port, however, was neither scheduled nor Trantorian. The mosquito-might of the Embassy was brought quickly and truculently into play. A needle-cannon lifted its puckered muzzle into the air. Force screens went up.

Radioed messages whipped back and forth. Stubborn words rode the impulses upward, agitated ones slipped down.

Lieutenant Canrum turned away from the instrument and said, "I don't know. He claims he'll be shot out of the sky in two minutes if we don't let him down. He claims Sanctuary."

Captain Elyut had just entered. He said, "Sure. Then Sark will claim we're interfering in politics and if Trantor decides to let things ride, you and I are broken as a gesture. Who is he?"

"Won't say," said the lieutenant with more than a little exasperation. "Says he must speak to the ambassador. Suppose you tell me what to do, captain."

The short-wave receiver sputtered and a voice, half-hysterical, said, "Is anyone *there?* I'm just coming down,

that's all. Really! I can't wait another moment I tell you." It ended in a squeak.

The captain said, "Great Space, I know that voice. Let him down! My responsibility!"

The orders went out. The gyroship sank vertically, more quickly than it ought to; the result of a hand at the controls that was both inexperienced and panicky. The needle-cannon maintained focus.

The captain established a through line to Abel and the Embassy was thrown into full emergency. The flight of Sarkite ships that hovered overhead not ten minutes after the first vessel had landed maintained a threatening vigil for two hours, then departed.

They sat at dinner, Abel, Junz and the newcomer. With admirable aplomb, considering the circumstances, Abel had acted the unconcerned host. For hours he refrained asking why a Great Squire needed Sanctuary.

Junz was far less patient. He hissed at Abel, "Space! What are you going to do with him?"

And Abel smiled back, "Nothing. At least until I find out whether I have my Townman or not. I like to know what my hand is before tossing chips onto the table. And since he's come to me, waiting will rattle him more than it will us."

He was right. Twice, the Squire launched into rapid monologue and twice, Abel said, "My dear Squire!

Surely serious conversation is unpleasant on an empty stomach." He smiled gently and ordered dinner.

Over the wine, the Squire tried again. He said, "You'll want to know why I have left Steen Continent."

"I cannot conceive of any reason," admitted Abel, "for the Squire of Steen ever to have to run from Sarkite vessels."

Steen watched them carefully. His slight figure and thin, pale face were tense with calculation. His long hair was bound into carefully arranged tufts held by tiny clips that rubbed against one another with a rustling sound whenever he moved his head, as though to call attention to his disregard for the current Sarkite clipped-hair fashion. A faint fragrance was exhaled by his skin and clothing.

Abel, who did not miss the slight tightening of Junz's lips and the quick way in which the spatioanalyst patted his own short, woolly hair, thought how amusing Junz's reaction might have been if Steen had appeared more typically, with rouged cheeks and coppered fingernails.

Steen said, "There was an intercontinental conference today."

"Really?" said Abel.

Abel listened to the tale of the conference without a quiver of countenance.

"And we have twenty-four hours," Steen said, indignantly. "It's sixteen hours now. Really!"

"And you're X," cried Junz, who had been growing increasingly restless during the recitation. "You're X. You've come here because he's caught you. Well now, that's fine. Abel, here's our proof as to the identity of the spatioanalyst. We can use him to force a surrender of the man."

Steen's thin voice had difficulty making itself heard over Junz's staunch baritone.

"You're mad. Stop it! Let me speak, I tell you. Your Excellency, I can't remember this man's name."

"Dr. Selim Junz, Squire."

"Well, then, Dr. Selim Junz, I have never in my life seen this idiot or spatioanalyst or whatever in the world he may be. Really! I never heard such nonsense. I am certainly not X. Imagine believing Fife's ridiculous melodrama! Really!"

Junz clung to his notion. "Why did you run then?"

"Good Sark, isn't it clear? Oh, I could choke. Really! Look here, don't you see what Fife was doing?"

Abel interrupted quietly. "If you'll explain, Squire, there will be no interruptions."

"Well, thank *you* at least." He continued, with an air of wounded dignity. "The others don't think much of me because I don't see the point of bothering with documents and statistics and all those boring details. But, really, what is the Civil Service for I'd like to know?

"Still that doesn't mean I'm a ninny, you know, just because I like

my comfort. Really! Maybe the others are blind, but I can see that Fife doesn't give a darn for the spatioanalyst. I don't think he even exists. Fife just got the idea a year ago and he's been manipulating it ever since.

"He's been playing us for fools and idiots. Really! And so the others are. Disgusting fools! He's *arranged* all this perfectly awful nonsense about idiots and spatioanalysis. I wouldn't be surprised if the native who's supposed to be killing Patrollers by the dozen isn't just one of Fife's spies in a red wig. Or if he's a real native, I suppose Fife has hired him.

"I wouldn't put it past Fife. Really! He would use natives against his own kind. That's how low he is.

"Anyway, it's obvious that he's using it just as an excuse to ruin the rest of us and to make himself dictator of Sark. Isn't it obvious to you?

"There isn't any X at all, but tomorrow, unless he's stopped, he'll spread the sub-etherics full of conspiracies and declarations of emergencies and he'll have himself declared Leader. We haven't had a Leader on Sark in five hundred years but that won't stop Fife. He'd just let the constitution go hang. Really!

"Only I mean to stop him. That's why I had to leave. If I were still in Steen, I'd be under house arrest.

"As soon as the conference was over, I had my own personal port checked, and, you know, his men had taken over. It was in clear disregard of continental autonomy. It was the act of a cad. Really! But nasty as he is, he isn't so bright. He thought some of us might try to leave the planet so he had the spaceports watched, but"—here he smiled in vulpine fashion and emitted the ghost of a giggle—"it didn't occur to him to watch the gyroports.

"Probably he thought there wasn't a place on the planet that would be safe for us. But I thought of the Trantorian Embassy. It's more than the others did. They make me tired. Especially Bort. Do you know Bort? He's terribly uncouth? Actually *dirty*. Talks at me as though there were something wrong with being clean and smelling pleasant."

He put his fingertips to his nose and inhaled gently.

Abel put a light hand on Junz's wrist as the latter moved restlessly in his seat. Abel said, "You have left a family behind. Have you thought that Fife can still hold a weapon over you?"

"I couldn't very well pile all my pretty ones in my gyroplane." He reddened a trifle. "Fife wouldn't dare touch them. Besides, I'll be back in Steen tomorrow."

"How?" asked Abel.

Steen looked at him in astonishment. His thin lips parted. "I'm offering alliance, your excellency. You can't pretend Trantor isn't *interested* in Sark. Surely you'll tell Fife that any attempt to change Sark's constitution

would necessitate Trantor's intervention."

"I scarcely see how that can be done, even if I felt my government would back me," said Abel.

"How can it *not* be done?" asked Steen, indignantly. "If he controls the entire *kyrt* trade, he'll raise the price, ask concessions for rapid delivery and all sorts of things."

"Don't the five of you control the price as is?"

Steen threw himself back in the seat. "Well, really! I don't know all the details. Next you'll be asking me for figures. Goodness, you're as bad as Bort." Then he recovered and giggled, "I'm just teasing, of course. What I mean is that with Fife out of the way, Trantor *might* make an arrangement with the rest of us. In return for your help, it would only be right that Trantor get preferential treatment, or even, maybe a small interest in the trade."

"And how would we keep intervention from developing into a galaxy-wide war?"

"Oh, but really, don't you see? It's plain as day. You wouldn't be *aggressors*. You would just be preventing civil war to keep the *kyrt* trade from disruption. I'd announce that I'd appealed to you for help. It would be worlds removed from aggression. The whole galaxy would be on your side. Of course, if Trantor benefits from it afterward, why, that's nobody's business at all. Really!"

Abel put his gnarled fingers together and regarded them. "I can't believe you really mean to join forces with Trantor."

An intense look of hatred passed momentarily over Steen's weakly-smiling face. He said, "Rather Trantor than Fife."

Abel said, "I don't like threatening force. Can't we wait and let matters develop a bit—"

"No, no," cried Steen. "Not a day. Really! If you're not firm now, right now, it will be too late. Once the deadline is past, he'll have gone too far to retreat without losing face. If you'll help me now, the people of Steen will back me, the other Great Squires will join me. If you wait even a day, Fife's propaganda mill will begin to grind. I'll be smeared as a renegade. Really! I! *I!* A renegade! He'll use all the anti-Trantor prejudice he can whip up and you know, meaning no offense, that's quite a bit."

"Suppose we ask him to allow us to interview the spatioanalyst?"

"What good will that do? He'll play both ends. He'll tell us the Florinian idiot is a spatioanalyst, but he'll tell you the spatioanalyst is not a Florinian idiot. You don't know the man. He's *awful!*"

Abel considered that. He hummed to himself, his forefinger keeping gentle time. Then he said, "We have the Townman, you know."

"What Townman?"

"The one who killed the Patrollers and the Sarkite."

"Oh! Well, really! Do you suppose Fife will care about that if it's a question of taking all Sark?"

"I think so. You see it isn't that we have the Townman. It's the circumstances of his capture. I think, Squire, that Fife will listen to me and listen very humbly, too."

For the first time in his acquaintance with Abel, Junz sensed a lessening of coolness in the old man's voice, a substitution for it of satisfaction, almost of triumph.

XV.

It was not very usual for the Lady Samia of Fife to feel frustrated. It was unprecedented, even inconceivable, that she had felt frustrated for a full twenty-four hours now.

The commander of the spaceport was Captain Racety all over again. He was polite, almost obsequious, looked unhappy, expressed his regrets, denied the least willingness to contradict her, and stood like iron against her plainly stated wishes.

She was finally forced from stating her desires to demanding her rights as though she were a common Sarkite. She said, "I suppose that as a citizen I have the right to meet any incoming vessel if I wish."

She was poisonous about it.

The commander cleared his throat and the expression of pain on his lined face grew, if anything, clearer and more definite. Finally, he said, "As a matter of fact, my lady, we have no wish at all to exclude you. It is only that we have received specific orders from the Squire, your father, to forbid your meeting the ship."

Samia said, frozenly, "Are you ordering me to leave the port, then?"

"No, my lady." The commander was glad to compromise. "We were not ordered to exclude you from the port. If you wish to remain here, you may do so. But, with all due respect, we will have to stop you from approaching closer to the pits."

He was gone and Samia sat in the futile luxury of her private ground-car, a hundred feet inside the outermost entrance of the port. They had been waiting and watching for her. They would probably keep on watching her. If she as much as rolled a wheel onward, she thought indignantly, they would probably cut her power-drive.

She gritted her teeth. It was unfair of her father to do this. It was all of a piece. They always treated her as though she understood nothing. Yet she had thought he understood.

He had risen from his seat to greet her, a thing he never did for anyone else now that mother was dead. He had clasped her, squeezed her tightly, abandoned all his work for her. He had even sent his secretary out of the room because he knew she was repelled by the native's still, white countenance.

It was almost like the old days before grandfather died when father had not yet become Great Squire.

He said, "Mia, child, I've counted the hours. I never knew it was such a long way from Florina. When I heard that those natives had hidden on your ship, the one I had sent just to insure your safety, I was nearly wild."

"Daddy! There was nothing to worry about."

"Wasn't there? I almost sent out the entire fleet to take you off and bring you in with full military security."

They laughed together at the thought. Minutes passed before Samia could bring the conversation back to the subject that filled her.

She said, casually, "What are you going to do with the stowaways, Dad?"

"Why do you want to know, Mia?"

"You don't think they've plans to assassinate you, or anything like that?"

Fife smiled, "You shouldn't think morbid thoughts."

"You don't think so, do you?" she insisted.

"Of course not."

"Good! Because I've talked to them, Dad, and I just don't believe they're anything more than poor harmless people. I don't care what Captain Racety says."

"They've broken a considerable number of laws for 'poor harmless people,' Mia."

"You can't treat them as common criminals, Dad." Her voice rose in alarm.

"How else?"

"The man isn't a native. He's from a planet called Earth and he's been psycho-probed and he's not responsible."

"Well, then, dear, Depsec will realize that. Suppose you leave it to them."

"No, it's too important to just leave to them. They won't understand. Nobody understands. Except I!"

"Only you in the whole world, Mia?" he asked indulgently, and put out a finger to stroke a lock of hair that had fallen over her forehead.

Samia said, with energy, "Only I! Only I! Everyone else is going to think he's crazy, but I'm *sure* he isn't. He says there is some great danger to Florina and to all the galaxy. He's a spatioanalyst and you know they specialize in cosmogony. He would *know!*"

"How do you know he's a spatioanalyst, Mia?"

"He says so."

"And what are the details of the danger?"

"He doesn't know. He's been psycho-probed. Don't you see that that's the best evidence of all. He knew too much. Someone was interested in keeping it dark." Her voice instinctively fell and grew huskily confidential. She restrained an impulse to look over her shoulder. She said, "If his theories were false, don't you see, there wouldn't have been any need to psycho-probe him."

"Why didn't they kill him, if that's the case?" asked Fife and instantly

regretted the question. There was no use in teasing the girl.

Samia thought a while, fruitlessly, then said, "If you'll order Depsec to let me speak to him, I'll find out. He trusts me. I know he does. I'll get more out of him than Depsec can. Please tell Depsec to let me see him, Dad. It's *very* important."

Fife squeezed her clenched fists gently and smiled at her, "Not yet, Mia. Not yet. In a few hours, we'll have the third person in our hands. After that, perhaps."

"The third person? The native who did all the killings?"

"Exactly. The ship carrying him will land in about an hour."

"And you won't do anything with the native girl and the spatioanalyst till then?"

"Not a thing."

"Good! I'll meet the ship." She rose.

"Where are you going, Mia?"

"To the port, father. I have a great deal to ask of this other native." She laughed, "I'll show you that your daughter can be quite a detective."

But Fife did not respond to her laughter. He said, "I'd rather you didn't."

"Why not?"

"It's essential that there be nothing out of the way about this man's arrival. You'd be too conspicuous at the port."

"What of it?"

"I can't explain statecraft to you, Mia."

"Statecraft, pooh." She leaned toward him, pecked a quick kiss at the center of his forehead and was gone.

Now he sat helplessly car-bound in the port while far overhead there was a growing speck in the sky, dark against the brightness of the late afternoon.

She pressed the button that opened the utility compartment and took out her polo glasses. Ordinarily, they were used to follow the gyrating antics of the one-man speedsters which took part in stratospheric polo. They could be put to more serious use, too. She put them to her eyes and the descending dot became a ship in miniature, the ruddy glow of its stern drive plainly visible.

She would at least see the men as they left, learn as much as she could by the one sense of sight, arrange an interview somehow, *somehow* thereafter.

Sark filled the visi-plate. A continent and half an ocean, obscured in part by the dead cotton-white of clouds, lay below.

Genro said, his words a trifle uneven, as the only indication that the better part of his mind was perforce on the controls before him, "The spaceport will not be heavily guarded. That was at my suggestion, too. I said that any unusual treatment of the arrival of the ship might warn Trantor that something was up. I said that success

depended upon Trantor being at no time aware of the true state of affairs until it was too late. Well, never mind that."

Terens shrugged his shoulders glumly. "What's the difference?"

"Plenty, to you. I will use the landing pit nearest the East Gate. You will get out the safety exit in the rear as soon as I land; walk quickly but not too quickly toward that gate. I have some papers that may get you through without trouble and may not. I'll leave it to you to make necessary action if there is trouble. From past history, I judge I can trust you that far. Outside the gate there will be a car waiting to take you to the Embassy. That's all."

"What about you?"

Slowly Sark was changing from a huge featureless sphere of blinding browns and greens and blues and cloud-white, into something more alive; into a surface broken by rivers and wrinkled by mountains.

Genro's smile was cool and humorless. "Your worries may end with yourself. When they find you gone, I may be shot as a traitor. If they find me completely helpless and physically unable to stop you, they may merely demote me as a fool. The latter, I suppose, is preferable, so I will ask you, before you leave, to use a neuronic whip on me."

The Townman said, "Do you know what a neuronic whip is like?"

"Quite." There were small drops of perspiration at his temples.

"How do you know I won't kill you afterward? I'm a Squire-killer, you know."

"I know. But killing me won't help you. It will just waste your time. I've taken worse chances."

The surface of Sark as viewed in the visi-plate was expanding; its edges rushed out past the border of visibility; its center grew and the new edges rushed out in turn. Something like the rainbow of a Sarkite city could be made out.

"I hope," said Genro, "you have no ideas of striking out on your own. Sark is no place for that. It's either Trantor or the Squires. Remember."

The view was definitely that of a city now and a green-brown patch on its outskirts expanded and became a spaceport below them. It floated up toward them at a slowing pace.

Genro said, "If Trantor doesn't have you in the next hour, the Squires will have you before the day is out. I don't guarantee what Trantor will do to you, but I can guarantee what Sark will do to you."

Terens had been in the Civil Service. He knew what Sark would do with a Squire-killer.

The port held steady in the visi-plate, but Genro no longer regarded it. He was switching to instruments, riding the pulse-beam downward. The ship turned slowly in air, a mile high, and settled, tail down.

A hundred yards above the pit, the engines thundered high. Over the hy-

draulic springs, Terens could feel their shuddering. He grew light and giddy in his seat.

Genro said, "Take the whip. Quickly now. Every second is important. The emergency lock will close behind you. It will take them five minutes to wonder why I don't open the main lock, another five minutes to break in, another five minutes to find you. You have fifteen minutes to get out of the port and into the car."

The shuddering ceased and in the thick silence, Terens knew they had made contact with Sark.

The shifting diamagnetic fields took over. The yacht tipped majestically and slowly moved down upon its side.

Genro said, "Now!" His uniform was wet with perspiration.

Terens, with swimming head and eyes that all but refused to focus, raised his neuronic whip—

Terens felt the nip of a Sarkite autumn. He had spent years in its harsh seasons until he had almost forgotten the soft eternal June of Florina. Now his days in Civil Service rushed back upon him as though he had never left this world of Squires.

Except that now he was a fugitive and branded upon him was the ultimate crime, the murder of a Squire.

He was walking in time to the pounding of his heart. Behind him was the ship and in it was Genro, frozen in the agony of the whip. The lock had closed softly behind him, and he was walking down a broad, paved path. There were workmen and mechanics in plenty about him. Each had his own job and his own troubles. They didn't stop to stare a man in the face. They had no reason to.

Had anyone actually seen him emerge from the ship?

He told himself no one had, or by now there would have been the clamor of pursuit.

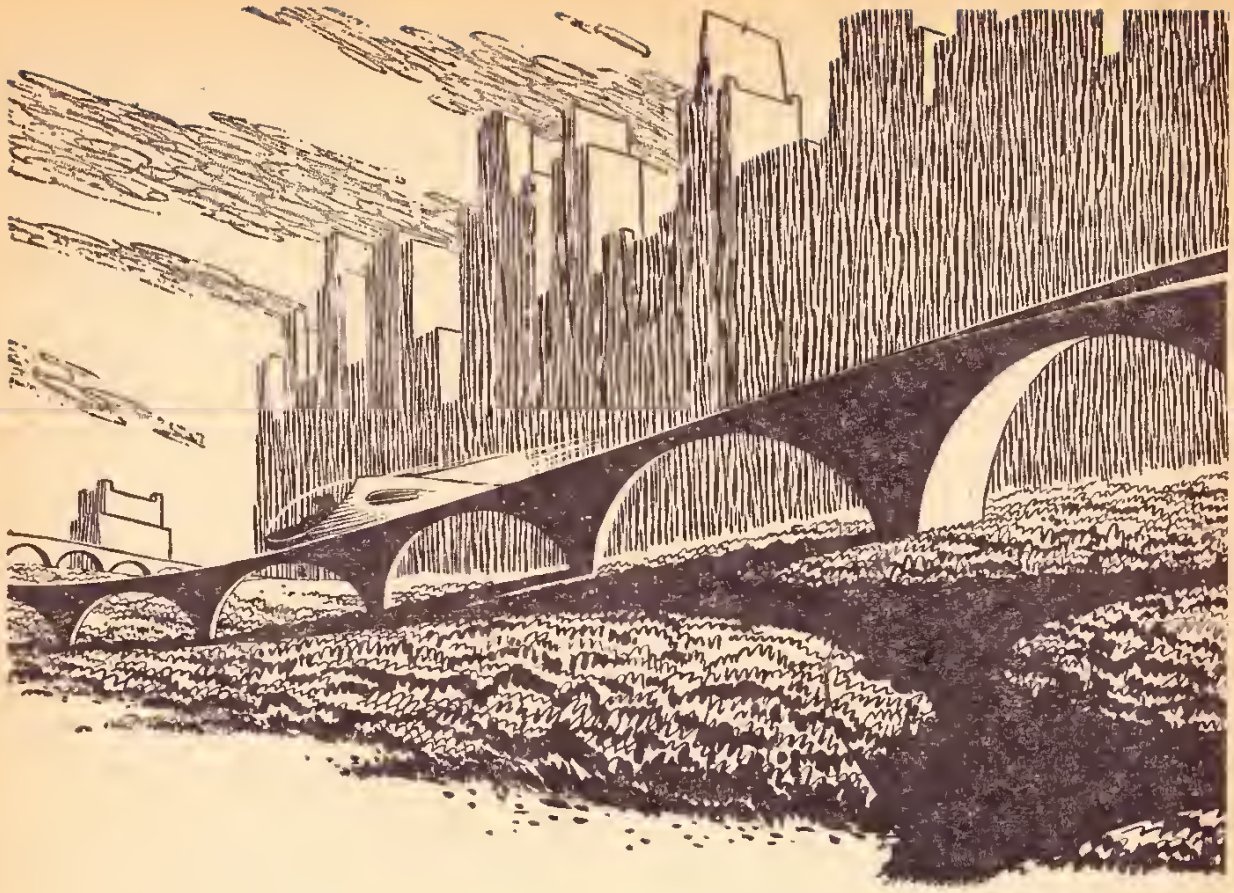
He touched his hat briefly. It was still down over his ears, and the little medallion it now carried was smooth to the touch. Genro had said that it would act as identification. The men from Trantor would be watching for just that medallion, glinting in the sun.

He could remove it, wander away on his own, find his way to another ship—somehow. He would get away from Sark—somehow. He would escape—somehow.

Too many somehows! In his heart, he knew he had come to the final end, and as Genro had said, it was either Trantor or Sark. He hated and feared Trantor, but he knew that in any choice it could not and must not be Sark.

"You! You there!"

Terens froze. He looked up in cold panic. The gate was a hundred feet away. If he ran— But they wouldn't allow a running man to get out. It was a thing he dared not do. He must not run.



The young woman was looking out the open window of a car such as Terens had never seen, not even during fifteen years on Sark. It gleamed with metal and sparkled with translucent gemmite.

She said, "Come here."

Terens' legs carried him slowly to the car. Genro had said Trantor's car would be waiting outside the port. Or had he? And would they send a woman on such an errand? A girl, in fact. A girl with a dark, beautiful face.

She said, "You arrived on the ship that just landed, didn't you?"

He was silent.

She became impatient. "Come, I saw you leave the ship!" She tapped her polo glasses. He had seen such glasses before.

Terens mumbled, "Yes. Yes."

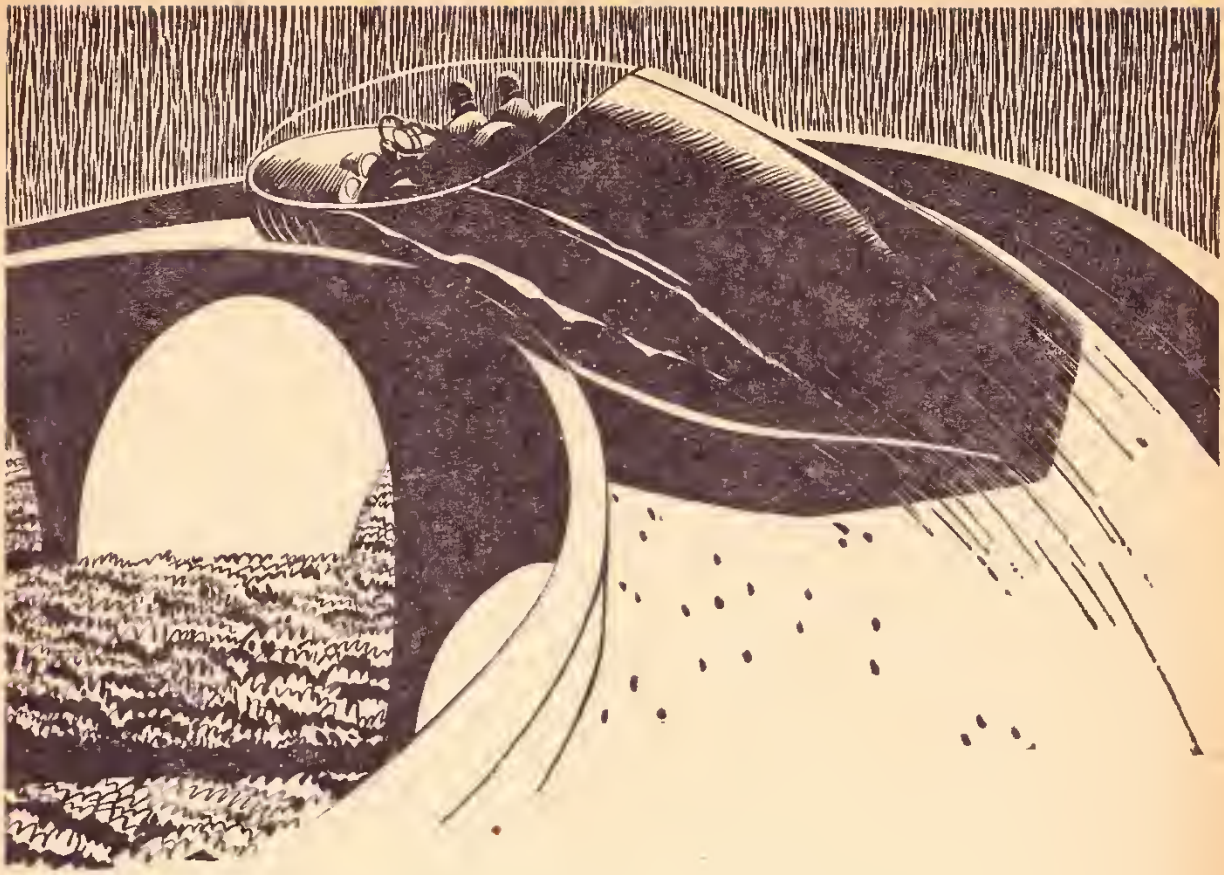
"Get in then."

She held the door open for him. The car was even more luxurious inside. The seat was soft and it all smelt new and fragrant and the girl was beautiful.

She said, "Are you a member of the crew?"

She was testing him, Terens imagined. He said, "You know who I am." He raised his fingers momentarily to the medallion.

Without any sound of motive power, the car backed and turned.



At the gate, Terens shrank back into the soft, cool, *kyrt*-covered upholstery, but there was no need for caution. The girl spoke peremptorily and they passed through.

She said, "This man is with me. I am Samia of Fife."

It took seconds for the tired Terens to hear and understand that. When he lurched tensely forward in his seat, the car was traveling along the express lanes at a hundred per.

A laborer within the port looked up from where he stood and muttered briefly into his lapel. He entered the building then and returned to his work. His superintendent frowned and made a mental note to talk to Tip about this habit of lingering outside to smoke cigarettes for half an hour at a time.

Outside the port one of two men in a ground-car said with annoyance, "Got into a car with a girl? What car? What girl?" For all his Sarkite costume, his accent belonged definitely to the Arcturian worlds of the Trantorian Empire.

His companion was a Sarkite, well-versed in the visi-cast news releases. When the car in question rolled through the gate and picked up speed as it began to veer off and upward to the express level, he half-rose in his seat

and cried, "It's the Lady Samia's car. There isn't another like it. Good galaxy, what do we do?"

"Follow," said the other, briefly.

"But the Lady Samia—"

"She's nothing to me. She shouldn't be anything to you, either. Or what are you doing here?"

Their own car was making the turn, climbing upward onto the broad, nearly empty stretches on which only the speediest of ground travel was permitted.

The Sarkite groaned, "We can't catch that car. As soon as she spots us, she'll kick out resistance. That car can make two-fifty."

"She's staying at a hundred so far," said the Arcturian.

After a while, he said, "She's not going to Depsec. That's for sure."

And after another while, he said, "She's not going to the Palace of Fife."

Still another interval and he said, "I'll be spun in space if I know *where* she's going. She'll be leaving the city again."

The Sarkite said, "How do we know it's the Squire-killer that's in there. Suppose it's a game to get us away from the post. She's not trying to shake us and she wouldn't use a car like that if she didn't *want* to be followed. You can't miss it at two miles."

"I know, but Fife wouldn't send his girl to get us out of the way. A squad of Patrollers would have done the job better."

"Maybe it isn't really the lady in it."

"We're going to find out, man. She's slowing. Flash past and stop around a curve!"

"I want to speak to you," said the girl.

Terens decided it was not the ordinary kind of trap he had first considered it. She *was* the Lady of Fife. She must be. It did not seem to occur to her that anyone could or ought to interfere with her.

She had never looked back to see if she were followed. Three times as they turned he noted the same car to the rear, keeping its distance, neither closing the gap nor falling behind.

It was not just a car. That was certain. It might be Trantor, which would be well. It might be Sark, in which case the lady would be a decent sort of hostage.

He said, "I'm ready to speak."

She said, "You were on the ship that brought the native from Florina? The one wanted for all those killings?"

"I said I was."

"Very well. Now I've brought you out here so that there'll be no interference. Was the native questioned during the trip to Sark?"

Such naïveté, Terens thought, could not be assumed. She really did not know who he was. He said, guardedly, "Yes."

"Were you present at the questioning?"

"Yes."

"Good. I thought so. Why did you leave the ship, by the way?"

That, thought Terens, was the question she should have asked first of all.

He said, "I was to bring a special report to—" He hesitated.

She seized on the hesitation eagerly, "To my father? Don't worry about that. I'll protect you completely. I'll say you came with me at my orders."

He said, "Very well, my lady."

The words, "My lady," struck deeply into his own consciousness. She was a lady, the greatest in the land, and he was a Florinian. A man who could kill Patrollers could learn easily how to kill Squires, and a Squire-killer might, by the same token, look a lady in the face.

He looked at her, his eyes hard and searching. He lifted his head and stared down at her.

She was very beautiful.

And because she was the greatest lady in the land, she was unconscious of his regard. She said, "I want you to tell me everything that you heard at the questioning. I want to know all that was told you by the native. It's very important."

"May I ask why you are interested in the native, my lady?"

"You may not," she said, flatly.

"As you wish, my lady."

He didn't know what he was going to say. With half of his consciousness, he was waiting for the pursuing car to catch up. With the other half, he was growing more aware of the beautiful girl sitting near him.

Florinians in the Civil Service and those acting as Townmen were, theoretically, celibates. In actual practice, most evaded that restriction when they could.

So it was all the more important that he had never been so near a beautiful girl in a car of such luxuriance under conditions of such isolation.

She was waiting for him to speak, dark eyes—(such dark eyes)—aflame with interest, full red lips parted in anticipation, a figure more beautiful for being set off in beautiful *kyrt*. She was completely unaware that anyone, *anyone*, could possibly dare harbor a dangerous thought with regard to the Lady of Fife.

The half of his consciousness that waited for the pursuers faded out.

He suddenly knew that the killing of a Squire was not the ultimate crime after all.

He wasn't quite aware that he moved. He knew only that her small body was in his arms, that it stiffened, that for an instant she cried out, and then he smothered the cry with his lips—

There were hands on his shoulder and the drift of cool air on his back through the opened door of the car. His fingers groped for his weapon, too late. It was ripped from his hand.

Samia gasped wordlessly.

The Sarkite said with horror, "Did you see what he did?"

The Arcturian said, "Never mind!"

He put a small black object into his pocket, and smoothed the seam shut. "Get him," he said.

The Sarkite dragged Terens out of the car with the energy of fury. "And she let him," he muttered. "She let him."

"Who *are* you?" cried Samia with sudden energy. "Did my father send you?"

The Arcturian said, "No questions, please."

"You're a foreigner," said Samia angrily.

The Sarkite said, "By Sark, I ought to bust his head in." He cocked his fist.

"Stop it!" said the Arcturian. He seized the Sarkite's wrist and forced it back.

The Sarkite growled sullenly, "There are limits. I can take the Squire-killing. I'd like to kill a few myself, but standing by and watching a native do what he did is just about too much for me."

Samia said, in an unnaturally high-pitched voice, "Native?"

The Sarkite leaned forward, snatched viciously at Terens' cap. The Townman paled but did not move. He kept his gaze steadily upon the girl and his sandy hair moved slightly in the breeze.

Samia moved helplessly back along the car seat as far as she could and then, with a quick movement, she covered her face with both hands, her skin turning white under the pressure of her fingers.

The Sarkite said, "What are we going to do with her?"

"Nothing."

"She saw us. She'll have the whole planet after us before we've gone a mile."

"Are you going to kill the Lady of Fife," asked the Arcturian, sarcastically.

"Well, no. But we can wreck her car. By the time she gets to a radiophone, we'll be all right."

"Not necessary." The Arcturian leaned into the car. "My lady, I have only a moment. Can you hear me?"

She did not move.

The Arcturian said, "You had better hear me. I am sorry I interrupted you at a tender moment but luckily, I have put that moment to use. I acted quickly and was able to record the scene by tri-camera. This is no bluff. I will transmit the negative to a safe place minutes after I leave you and thereafter any interference on your part will force me to be rather nasty. I'm sure you understand me."

He turned away. "She won't say anything about this. Not a thing. Come along with me, Townman."

Terens followed. He could not look back at the white, pinched face in the car.

Whatever might now follow, he had accomplished a miracle. For one moment, he had kissed the proudest

Lady on Sark and had felt the fleeting touch of her soft, fragrant lips.

XVI.

Diplomacy has a language and a set of attitudes all its own. Relationships between the representatives of sovereign states, if conducted strictly according to protocol, are stylized and stultifying. The phrase, "unpleasant consequences" becomes synonymous with war and "suitable adjustment" with surrender.

When on his own, Abel preferred to abandon diplomatic double talk. With a tight personal beam connecting himself and Fife, he might merely have been an elderly man talking amiably over a glass of wine.

He said, "You have been hard to reach, Fife."

Fife smiled. He seemed at ease and undisturbed. "A busy day, Abel."

"Yes. I've heard a bit about it."

"Steen?" Fife was casual.

"Partly. Steen's been with us about seven hours."

"I know. My own fault, too. Are you considering turning him over to us?"

"I'm afraid not."

"He's a criminal."

Abel chuckled and turned the goblet in his hand, watching the lazy bubbles. "I think we can make out a case for his being a political refugee. Interstellar law will protect him on Trantorian territory."

"Will your government back you?"

"I think it will, Fife. I haven't been in the foreign service for thirty-seven years without knowing what Trantor will back and what it won't."

"I can have Sark ask for your recall."

"What good would that do? I'm a peaceable man with whom you are well acquainted. My successor might be anybody."

There was a pause. Fife's leonine countenance puckered. "I think you have a suggestion."

"I do. You have a man of ours."

"What man of yours?"

"A spatioanalyst. A native of the planet, Earth, which, by the way, is part of the Trantorian domain."

"Steen told you this?"

"Among other things."

"Has he seen this Earthman?"

"He hasn't said he has."

"Well, he hasn't. Under the circumstances, I doubt that you can have faith in his word."

Abel put down his glass. He clasped his hands loosely in his lap and said, "Just the same, I'm sure the Earthman exists. I tell you, Fife, we should get together on this. I have Steen and you have the Earthman. In a sense, we're even. Before you go on with your current plans, before your ultimatum expires and your *coup d'état* takes place, why not a conference on the *kyrt* situation generally."

"I don't see the necessity. What is happening on Sark now is an internal

matter entirely. I'm quite willing to guarantee personally that there will be no interference with the *kyrt* trade regardless of political events here. I think that should end Trantor's legitimate interests."

Abel sipped at his wine, seemed to consider. He said, "It seems we have a second political refugee. He received sanctuary not more than three hours ago. A curious case. One of your Florinian subjects, by the way. A Townman. Myrlyn Terens, he calls himself."

Fife's eyes blazed suddenly. "We half suspected that. By Sark, Abel, there's a limit to the open interference of Trantor on this planet. The man you have kidnaped is a triple murderer. You can't make a political refugee out of him."

"Well, now, do you want the man?"

"You have a deal in mind? Is that it?"

"The conference I spoke of."

"For one Florinian murderer. Of course not."

"But the manner in which the Townman managed to escape to us is rather curious. You may be interested —"

Junz paced the floor, shaking his head. The night was already well-advanced. He would like to be able to sleep but he knew he would require somnin once again.

Abel said, "I might have had to threaten force, as Steen suggested. That would have been bad. The risks would have been awful, the results uncertain. Yet until the Townman was brought to us, I saw no alternative, except of course, a policy of do-nothing."

Junz shook his head violently, "No. Something had to be done. Yet, it amounted to blackmail."

"Technically, I suppose so. What would you have had me do?"

"Exactly what you did. I'm not a hypocrite, Abel. Or I try not to be. I won't condemn your methods when I intend to make full use of the results. Still, what about the girl."

"She won't be hurt as long as Fife keeps his bargain."

"I'm sorry for her. I've grown to dislike the Sarkite aristocrats for what they've done to Florina, but I can't help feeling sorry for her."

"As an individual, yes. But the true responsibility lies with Sark itself. Look here, old man, did you ever kiss a girl in a ground-car?"

The tip of a smile quivered at the corners of Junz's mouth. "Yes."

"So have I, though I have to call upon longer memories than you do, I imagine. My eldest granddaughter is probably engaged in the practice at this moment, I shouldn't wonder. What is a stolen kiss in a ground-car, anyway, except the expression of the most natural emotion in the galaxy.

"Look here, man. We have a girl, admittedly of high social standing,

who, through mistake, finds herself in the same car with, let us say, a criminal. He seizes the opportunity to kiss her. It's on impulse and without her consent. How ought she to feel? How ought her father to feel? Chagrined? Perhaps. Annoyed? Certainly. Angry? Offended? Insulted? All that, yes. But disgraced? No! Disgraced enough to be willing to endanger important affairs of state to avoid exposure? Nonsense.

"But that's exactly the situation and it could happen only on Sark. The Lady Samia is guilty of nothing but willfullness and a certain naïveté. She has, I am sure, been kissed before. If she kissed again, if she kissed innumerable times, anyone but a Florinian, nothing would be said. But she *did* kiss a Florinian.

"It doesn't matter that she did not know he was a Florinian. It doesn't matter that he forced the kiss upon her. To make public the photograph we have of the Lady Samia in the arms of the Florinian would make life unbearable for her and for her father. I saw Fife's face when he stared at the reproduction. There was no way of telling for certain that the Townman was a Florinian. He was in Sarkite costume with a cap that covered his hair well. He was light-skinned, but that was inconclusive. Still, Fife knew that the rumor would be gladly believed by many who were interested in scandal and sensation and that the picture would be considered incontrovertible proof. And he knew that his political enemies would make the greatest possible capital out of it. You may call it blackmail, Junz, and maybe it is, but it's a blackmail that would not work on any other planet in the galaxy. Their own sick social system gave us this weapon and I have no compunction about using it."

Junz sighed. "What's the final arrangement?"

"We'll meet at noon tomorrow."

"His ultimatum has been postponed then?"

"Indefinitely. I will be at his office in person."

"Is that a necessary risk?"

"It's not much of one. There will be witnesses. And I am anxious to be in the material presence of this spatio-analyst you have been searching for so long."

"I'll attend?" asked Junz, anxiously.

"Oh, yes. The Townman as well. We'll need him to identify the spatio-analyst. And Steen, of course. All of you will be present by trimensic personification."

"Thank you."

The Trantorian ambassador smothered a yawn and blinked at Junz through watering eyes. "Now, if you don't mind, I've been awake for two days and a night and I'm afraid my old body can take no more antisomnin. I must sleep."

With trimensic personification per-

fected, important conferences were rarely held face to face. Fife felt strongly an element of actual indecency in the material presence of the old ambassador. His olive complexion could not be said to have darkened, but its lines were set in silent anger.

It had to be silent. He could say nothing. He could only stare sullenly at the men who faced him.

Abel! An old dotard in shabby clothes with a million worlds behind him.

Junz! A dark-skinned, woolly-haired interferer whose perseverance had precipitated the crisis.

Steen! The traitor! Afraid to meet his eyes!

The Townman! To look at him was most difficult of all. He was the native who had dishonored his daughter with his touch yet who could remain safe and untouchable behind the walls of the Trantorian Embassy. He would have been glad to grind his teeth and pound his desk if he had been alone. As it was, not a muscle of his face must move though it tore beneath the strain.

If Samia had not—He dropped that. His own negligence had cultivated her willfullness and he could not blame her for it now. She had not tried to excuse herself or soften her own guilt. She had told him her private attempts to play the interstellar spy and how horribly it had ended. She had relied completely, in her shame and bitterness, on his understanding, and she would have that much. She would have that much, if it meant the ruin of the structure he had been building.

He said, "This conference has been forced upon me. I see no point in saying anything. I'm here to listen."

Abel said, "I believe Steen would like to have his say first."

Fife's eyes filled with contempt that stung Steen.

Steen yelled his answer, "You made me turn to Trantor, Fife. You violated the principle of autonomy. You couldn't expect me to stand for that. Really."

Fife said nothing and Abel said, not without a little contempt of his own, "Get to your point, Steen. You said you had something to say. Say it."

Steen's sallow cheekbones reddened without benefit of rouge. "I will, and right now. Of course, I don't claim to be the detective that the Squire of Fife represents himself to be, but I can think. Really! And I've *been* thinking. Fife had a story to tell yesterday, all about a mysterious traitor he called X. I could see it was just a lot of talk so that he could declare an emergency. I wasn't fooled a minute."

"There's no X?" asked Fife, quietly. "Then why did *you* run? A man who runs needs no other accusation."

"Is that so? Really?" cried Steen. "Well, I would run out of a burning building even if I had not set the fire myself."

"Go on, Steen," said Abel.

Steen licked his lips and turned to a minute consideration of his fingernails. He smoothed them gently as he spoke. "But then I thought, why make up that particular story with all its complications and things. It's not his way. Really! It's not Fife's way. I know him. We all know him. He has no imagination at all, your excellency. A brute of a man! Almost as bad as Bort."

Fife scowled "Is he saying something, Abel, or is he babbling?"

"Go on, Steen," said Abel.

"I will, if you'll let me talk. My goodness! Whose side are you on? I said to myself—this was after dinner—why would a man like Fife make up a story like that. There was only one answer. He couldn't make it up. Not with *his* mind. So it was true. It must be true. And, of course, Patrollers *had* been killed, though Fife is quite capable of arranging to have that happen."

Fife shrugged his shoulders.

Steen drove on, "Only who is X? It isn't I. Really! I know it isn't I! And I'll admit it could only have been a Great Squire. But what Great Squire knew most about it, anyway? What Great Squire has been trying to use the story of the spatioanalyst for a year now to frighten the others into some sort of what he calls 'united effort' and what I call surrender to a Fife dictatorship?

"I'll tell you who X is." Steen stood up, the top of his head brushing the edge of the receptor cube and flattening as the uppermost inch sliced off into nothingness. He pointed a trembling finger. "*He's* X. The Squire of Fife. He found this spatioanalyst. He put him out of the way, when he saw the rest of us weren't impressed with his silly remarks at our first conference and then he brought him out again after he had already arranged a military coup."

Fife turned wearily to Abel. "Is he through? If so, remove him. He is an unbearable offense to any decent man."

Abel said, "Have you any comment to make on what he says?"

"Of course not. It isn't worth comment. The man is desperate. He'll say anything."

"You can't just brush it off, Fife," called Steen. He looked about at the rest. His eyes narrowed and the skin at his nostrils was white with tension. He remained standing. "Listen. He said his investigators found records in a doctor's office. He said the doctor had died by accident after diagnosing the spatioanslyst as the victim of psychoprobing. He said it was murder by X to keep the identity of the spatioanalyst secret. That's what he said. Ask him. Ask him if that isn't what he said."

"And if I did?" asked Fife.

"Then ask him how he could get the records from the office of a doctor who was dead and buried for months unless he had them all along. Really!"

Fife said, "This is foolish. We can

waste time indefinitely this way. Another doctor took over the dead man's practice and his records as well. Do any of you think medical records are destroyed along with a physician?"

Abel said, "No, of course not."

Steen stuttered, then sat down.

Fife said, "What's next? Have any of you more to say? More accusations? More anything?" His voice was low. Bitterness showed through.

Abel said, "Why, that was Steen's say, and we'll let it pass. Now Junz and I, we're here on another kind of business. We would like to see the spatioanalyst."

Fife's hands had been resting upon the desk top. They lifted now and came down to clutch the edge of the desk. His black eyebrows drew together.

He said, "We have in custody a man of subnormal mentality who claims to be a spatioanalyst. I'll have him brought in!"

Valona March had never, never in her life dreamed such impossibilities could exist. For over a day now, ever since she had landed on this planet of Sark, there had been a touch of wonder about everything. Even the prison cells in which she and Rik had been separately placed seemed to have an unreal quality of magnificence about them. Water came out of a hole in a pipe when you pressed a button. Heat came out of the wall, although the air outside had been colder than she had thought air could possibly get. And everyone who spoke to her wore such beautiful clothes.

She had been in rooms in which were all sorts of things she had never seen before. This one now was larger than any yet but it was almost bare. It had

more people in it, though. There was a stern looking man behind a desk, and a much older, very wrinkled man in a chair, and three others—

One was the Townman!

She jumped up and ran to him. "Townman! Townman!"

But he wasn't there!

He had got up and waved at her. "Stay back, Lona. Stay back!"

And she passed right through him. She had reached out to seize his sleeve; he moved it away; she lunged, half-stumbling, and passed right through him. For a moment, the breath went out of her body. The Townman had turned, was facing her again, but she could only stare down at her legs.

Both of them were thrusting through the heavy arm of the chair in which the Townman had been sitting. She could see it plainly, in all its color and solidity. It encircled her legs but she did not feel it. She put out a trembling hand and her fingers sank an inch deep into upholstery they could not feel either. Her fingers remained visible.

She shrieked and fell, her last sensation being that of the Townman's arms reaching automatically for her and herself falling through their circle as though they were pieces of flesh-tinted air.

She was in a chair again, Rik holding one hand tightly and the old, wrinkled man leaning over her.

He was saying, "Don't be frightened, my dear. It's just a picture. A photograph, you know."

Valona looked about. The Townman was still sitting there. He wasn't looking at her.

She pointed a finger, "Isn't he there?"

Rik said, suddenly, "It's a trimensic personification, Lona. He's somewhere else, but we can see him from here."

Valona shook her head. If Rik said so, it was all right. But she lowered her eyes. She dared not look at people who were there and not there at the same time.

Abel said to Rik, "So you know what trimensic personification is, young man?"

"Yes, sir." It had been a tremendous day for Rik, too, but where Valona was increasingly dazzled, he had found things increasingly familiar and comprehensible.

"Where did you learn that?"

"I don't know. I knew it before . . . before I forgot."

Fife had not moved from his seat behind the desk during the wild plunge of Valona March toward the Townman.

He said, acidly, "I am sorry to have to disturb this meeting by bringing in an hysterical native woman. The so-called spatioanalyst required her presence."

"It's all right," said Abel. "But I notice that your Florinian of subnormal mentality seems to be acquainted with trimensic personification."

"He has been well drilled, I imagine," said Fife.

Abel said, "Has he been questioned since arriving on Sark?"

"He certainly has."

"With what result?"

"No new information."

Abel turned to Rik. "What's your name?"

"Rik is the only name I remember," said Rik, calmly.

"Do you know anyone here?"

Rik looked from face to face, without fear. He said, "Only the Townman. And Lona, of course."

"This," said Abel, gesturing toward Fife, "is the greatest Squire that ever lived. He owns the whole world. What do you think of him?"

Rik said, boldly, "I'm an Earthman. He doesn't own *me*."

Abel said in an aside to Fife, "I don't think an adult native Florinian could be trained into that sort of defiance."

"Even with a psycho probe?" returned Fife, scornfully.

"Do you know this gentleman?" asked Abel, returning to Rik.

"No, sir."

"This is Dr. Selim Junz. He's an important official at the Interstellar Bureau of Spatioanalysis."

Rik looked at him intently. "Then he'd be one of my chiefs. But I don't know him. Or maybe I just don't remember."

Junz shook his head, gloomily, "I've never seen him, Abel."

"That's something for the record," muttered Fife.

"Now listen, Rik," said Abel. "I'm going to tell you a story. I want you to listen with all your mind and think. Think and think! Do you understand me?"

Rik nodded.

Abel talked slowly. His voice was the only sound in the room for long minutes. As he went on, Rik's eyelids closed and screwed themselves into knots. His lips drew back, his fists moved up to his chest, and his head bent forward. He had the look of a man in agony.

Abel talked on, passing back and forth across the reconstruction of events as they had originally been presented by the Squire of Fife. He talked of the original message of disaster, of its interception, of the meeting between Rik and X, of the psycho-probing, of how Rik had been found and brought up on Florina, of the doctor who diagnosed him and then died, of his returning memory.

He said, "That's the whole story, Rik. I've told you all of it. Does anything sound familiar to you?"

Slowly, painfully, Rik said, "I remember the last parts; you know, the last few days. I remember something further back, too. Maybe it was the doctor, when I first started talking. It's very dim. But that's all."

Abel said, "But you *do* remember further back. You remember danger to Florina."

"Yes. Yes. That was the first thing I remembered."

"Then can't you remember after that? You landed on Sark and met a man."

Rik moaned, "I can't. I can't remember."

"Try! Try!"

Rik looked up. His white face was wet with perspiration. "I remember a word."

"What word, Rik?"

"It doesn't make sense."

"Tell us, anyway."

"It goes along with a table. Long, long ago. Very dim. I was sitting. I think, maybe, someone else was sitting. Then he was standing, looking down at me. And there's a word."

Abel was patient. "What word."

Rik clenched his fists and whispered, "Fife!"

Every man but Fife rose to his feet. Steen shrieked, "I told you" and burst into a high-pitched bubbling cackle.

XVII.

Fife said, with tightly-controlled passion, "Let us end this farce."

He had waited before speaking, his eyes hard and his face expressionless until in sheer anticlimax the rest were forced to take their seats again. Rik had bent his head, eyes screwed painfully shut, probing his own aching mind. Valona pulled him toward herself, trying hard to cradle his head on her shoulder, stroking his cheek softly.

Abel said, shakily, "Why do you say this is a farce?"

Fife said, "Isn't it? I agreed to this meeting in the first place only because of a particular threat you held over me. I would have refused even so if I had known the conference was intended to be a trial of myself with renegades and murderers acting as both prosecutors and jury."

Abel frowned and said with chilling formality, "This is not a trial, Squire. Dr. Junz is here in order to recover the person of a member of the I.S.B., as is right and duty. I am here to protect the interests of Trantor in a troubled time. There is no doubt in my mind that this man, Rik, is the missing spatioanalyst. We can end this part of the conference immediately if you will agree to turn over the man to Dr. Junz for further examination, including a check of physical characteristics. We would naturally require your further help in finding the guilty psycho-prober and in setting up safeguards against a future repetition of such acts against what is, after all, an interstellar agency which has consistently held itself above regional politics."

Fife said, "Quite a speech! But the obvious remains obvious and your plans are quite transparent. What would happen if I gave up this man? I rather think that the I.S.B. will manage to find out exactly what it wants to find out. It claims to be an interstellar

agency with no regional ties, but it's a fact, isn't it, that Trantor contributes two-thirds of its annual budget? I doubt that any reasonable observer would consider it really neutral in the galaxy of today. Its findings with regard to this man will surely suit Trantor's imperial interests.

"And what will these findings be? That's obvious, too. The man's memory will slowly come back. The I.S.B. will issue daily bulletins. Bit by bit, he will remember more and more of the necessary details. First, my name. Then, my appearance. Then, my exact words. I will be solemnly declared guilty. Reparations will be required and Trantor will be forced to occupy Sark temporarily, an occupation which will somehow become permanent.

"There are limits beyond which any blackmail breaks down. Yours, Mr. Ambassador, ends here. If you want this man, have Trantor send a fleet after him."

"There is no question of force," said Abel. "Yet I notice that you have carefully avoided the implication in what the spatioanalyst has last said."

"There isn't any implication that I need dignify by a denial. He remembers a word, or says he does. What of it?"

"Doesn't it mean anything that he does?"

"Nothing at all. The name, Fife, is a great one on Sark. Even if we assume the so-called spatioanalyst is sincere, he had a year's opportunity to hear the name on Florina. He came to Sark on a ship that carried my daughter; a still better opportunity to have heard the name of Fife. What is more natural than that the name became involved with his trace memories. Of course, he may not be sincere. This man's bit-by-bit disclosures may be well-rehearsed."

Abel thought of nothing to say. He looked at the others. Junz was frowning darkly, the fingers of his right hand slowly kneading his chin. Steen was simpering foolishly and muttering to himself. The Florinian Townman stared blankly at his knees.

It was Rik who spoke, forcing himself from Valona's grasp and standing up.

"Listen," he said. His pale face was twisted. His eyes mirrored pain.

Fife said, "Another disclosure, I suppose."

Rik said, "Listen! We were sitting at a table. The tea was drugged. We had been quarreling. I don't remember why. Then I couldn't move. I could only sit there. I couldn't talk. I could only think, Great Space, I've been drugged. I wanted to shout and scream and run, but I couldn't. Then the other one, Fife, came. He had been shouting at me. Only now he wasn't shouting. He didn't have to. He came around the table. He stood there, towering over me. I couldn't say anything. I couldn't do anything. I could only try to turn my eyeballs up

toward him."

Rik remained standing, silent.

Selim Junz said, "This other man was Fife?"

"I remember his name was Fife."

"Well, was he that man?"

Rik did not turn to look. He said, "I can't remember what he looked like."

"Are you sure?"

"I've been trying." He burst out, "You don't know how hard it is. It hurts! It's like a red-hot needle. Deep! In here!" He put his hands to his head.

Junz said, softly, "I know it's hard. But you must try. Don't you see you must keep on trying. Look at that man! Turn and look at him!"

Rik twisted toward the Squire of Fife. For a moment, he stared, then turned away.

Junz said, "Can you remember now?"

"No! No!"

Fife smiled grimly. "Has your man forgotten his lines, or will the story seem more believable if he remembers my face the next time around?"

Junz said, hotly, "I have never seen this man before, and I have never spoken to him. There has been no arrangement to frame you and I am tired of your accusations in that directions. I am after the truth only."

"Then may I ask him a few questions?"

"Go ahead."

"Thank you, I'm sure, for your kindness. Now you . . . Rik, or whatever your real name is—"

He was a Squire, addressing a Florinian.

Rik looked up. "Yes, sir."

"You remember a man approaching you from the other side of the table as you sat there, drugged and helpless."

"Yes, sir."

"The last thing you remember is this man staring down at you."

"Yes, sir."

"You stared up at him, or tried to."

"Yes, sir."

"Sit down."

Rik did so.

For a moment, Fife did nothing. His lipless mouth might have grown tighter, the jaw muscles under the blue-black sheen of the stubble on his cheeks and chin bunched a bit. Then he slid down from his chair.

Slid *down!* It was as though he had got down on his knees there behind the desk.

But he moved from behind it and was seen plainly to be standing.

Junz's head swam. The man, so statuesque and formidable in his seat, had been converted without warning into a pitiful midget.

Fife's deformed legs moved under him with an effort, carrying the ungainly mass of torso and head forward. His face flushed but his eyes kept their look of arrogance intact. Steen broke into a wild giggle and choked it off when those eyes turned on him. The rest sat in fascinated silence.

Rik, wide-eyed, watched him ap-

proach.

Fife said, "Was I the man who approached you around the table?"

"I can't remember his face, sir."

"I don't ask you to remember his face. Can you have forgotten this?" His two arms went wide, framing his body. "Can you have forgotten my appearance; my walk?"

Rik said, miserably. "It seems I shouldn't, sir, but I don't know."

"But you were sitting, he was standing, and you were looking up at him."

"Yes, sir."

"He was looking down at you; 'towering' over you, in fact."

"Yes, sir."

"You remember that at least? You're certain of that?"

"Yes, sir."

The two were now face to face.

"Am I looking down at you?"

Rik said, "No, sir."

"Are you looking up at me?"

Rik, sitting, and Fife, standing, stared levelly at one another, eye to eye.

"No, sir."

"Could I have been the man?"

"No, sir."

"Are you certain?"

"Yes, sir."

"You still say the name you remember is Fife?"

"I remember that name," insisted Rik stubbornly.

"Whoever it was then, used my name as a disguise?"

"He . . . he must have."

Fife turned and with slow dignity struggled back to his desk and climbed into his seat.

He said, "I have never allowed any man to see me standing before this in all my adult life. Is there any reason why this conference should continue?"

Abel was at once embarrassed and annoyed. So far the conference had back-fired badly. At every step, Fife had managed to put himself in the right, the others in the wrong. Fife had successfully presented himself as a martyr. He had been forced into conference by Trantorian blackmail, and made the subject of false accusations that had broken down at once.

Fife would see to it that his version of the conference would flood the galaxy and he would not have to depart very far from the truth to make it excellent anti-Trantorian propaganda.

Abel would have liked to cut his losses. The psycho-probed spatio-analyst would be of no use to Trantor now. Any "memory" he might have thereafter would be laughed down, made ridiculous, however true it might be. He would be accepted as an instrument of Trantorian imperialism, and a broken instrument at that.

But he hesitated, and it was Junz who spoke.

Junz said, "It seems to me there's a very good reason for not ending the conference just yet. We have not yet determined exactly who is responsible

for the psycho-probing. You have accused the Squire of Steen, and Steen has accused you. Granting that both of you are mistaken and that both are innocent, it still remains true that you each believe one of the Great Squires is guilty. Which one, then?"

"Does it matter?" asked Fife. "As far as you're concerned, I'm sure it doesn't. That matter would have been solved by now except for the interference of Trantor and the I.S.B. Eventually, I will find the traitor. Remember that the psycho prober, whoever he is, had the original intention of forcing a monopoly of the *kyrt* trade into his own hands, so I am not likely to let him escape. Once the psycho prober is identified and dealt with, your man here will be returned unharmed to you. That is the only offer I can make and it is a very reasonable one."

"What will you do with the psycho prober?"

"That is a purely internal matter that does not concern you."

"But it does," Junz said, energetically. "This is not just a question of the spatioanalyst. There's something of greater importance involved and I'm surprised that it hasn't been mentioned yet. This man, Rik, wasn't psycho-probed just because he was a spatioanalyst."

Abel was not sure what Junz's intentions were, but he threw his weight into the scales. He said, blandly, "Dr. Junz is referring, of course, to the spatioanalyst's original message of danger."

Fife shrugged. "As far as I know, no one has yet attached any importance to that, including Dr. Junz over the past year. However, your man is here, doctor. Ask him what it's all about."

"Naturally, he won't remember." Junz retorted angrily. "The psycho probe is most effective upon the more intellectual chains of reasoning stored in the mind. The man may never recover the quantitative aspects of his life work."

"Then it's gone," said Fife. "What can be done about that?"

"Something very definite. That's the point. There's someone else who knows, and that's the psycho prober. He may not have been a spatioanalyst himself; he may not know the precise details. However, he spoke to the man in a state of untouched mind. He will have learned enough to put us far on the right track. Without having learned enough he would not have dared to destroy the source of his information. Still, for the record, *do* you remember, Rik?"

"Only that there was danger and that it involved the currents of space," muttered Rik.

Fife said, "Even if you find out, what will you have? How reliable are any of the startling theories that sick spatioanalysts are forever coming up with. Many of them think they know the secrets of the universe when

they're so sick they can barely read their instruments."

"It may be that you are right. Are you afraid to let me find out?"

"I am against starting any morbid rumors that might, whether true or false, affect the *kyrt* trade. Don't you agree with me, Abel?"

Abel squirmed inwardly. Fife was maneuvering himself into the position where any break in *kyrt* deliveries resulting from his own *coup* could be blamed on Trantorian maneuvers. But Abel was a good gambler. He raised the stakes calmly and unemotionally.

He said, "I don't. I suggest you listen to Dr. Junz."

"Thanks," said Junz. "Now you have said, Squire Fife, that whoever the psycho prober was, he must have killed the doctor who examined this man, Rik. That implies that the psycho prober had kept some sort of watch over Rik during his stay on Florina."

"Well?"

"There must be traces of that kind of watching."

"You mean you think these natives would know who was watching them."

"Why not?"

Fife said, "You are not a Sarkite and so you make mistakes. I assure you that natives keep their places. They don't approach Squires and if Squires approach them they know enough to keep their eyes on their toes. They would know nothing of being watched."

Junz quivered visibly with indignation. The Squires had their despotism so ingrained that they saw nothing wrong or shameful in speaking of it openly.

He said, "Ordinary natives perhaps. But we have a man here who is not an ordinary native. I think he has shown us rather thoroughly that he is not a properly respectful Florinian. So far he has contributed nothing to the discussion and it is time to ask him a few questions."

Fife said, "That native's evidence is worthless. In fact, I take the opportunity once more to demand that Trantor surrender him to proper trial by the courts of Sark."

"Let me speak to him first."

Abel put in, mildly, "I think it will do no harm to ask him a few questions, Fife. If he proves unco-operative or unreliable, we may consider your request for extradition."

Terens who, till now, had stolidly concentrated on the fingers of his clasped hands, looked up briefly.

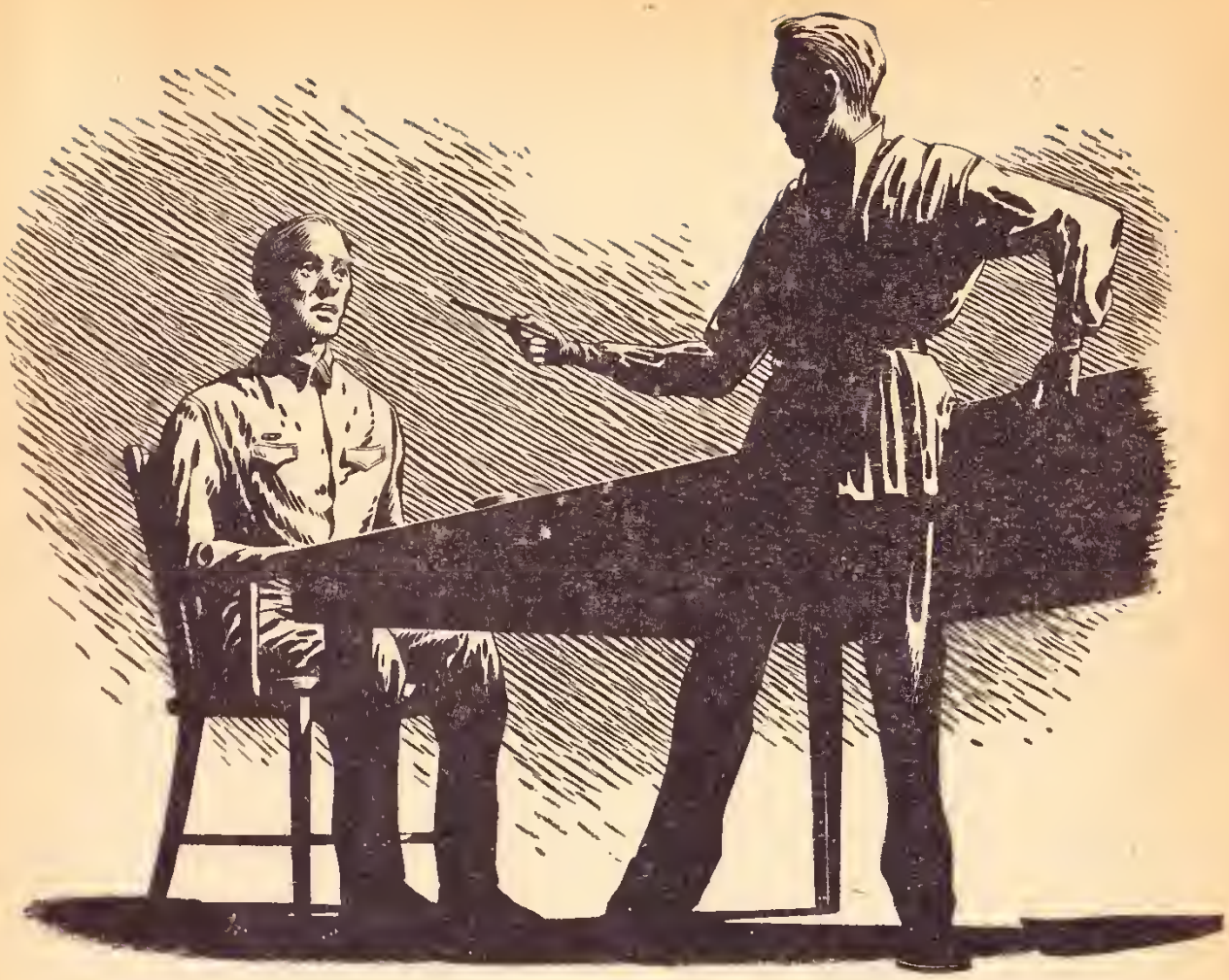
Junz turned to Terens. He said, "Rik has been in your town since he was first found on Florina, hasn't he?"

"Yes."

"And you were in town all that time? I mean you weren't on any extended business trips, were you?"

"Townmen don't make business trips. Their business is in their town."

"All right. Now relax and don't get



touchy. It would be part of your business to know about any Squire that might come to town, I imagine."

"Sure. When they come."

"Did they come?"

Terens shrugged. "Once or twice. Pure routine, I assure you. Squires don't dirty their hands with *kyrt*. Unprocessed *kyrt*, that is."

"Be respectful!" roared Fife.

Terens looked at him and said, "Can you make me?"

Abel interrupted smoothly, "Let's keep this between the man and Dr. Junz, Fife. You and I are spectators."

Junz felt a glow of pleasure at the Townman's insolence, but he said, "Answer my questions without side comments please, Townman. Now who exactly were the Squires who visited your town this past year?"

Terens said, fiercely, "How can I know? I can't answer that question. Squires are Squires and natives are natives. I may be a Townman but I'm still a native to them. I don't greet them at the town gates and ask their names.

"I get a message, that's all. It's addressed 'Townman'. It says there'll be a Squire's Inspection on such-and-such a day and I'm to make the necessary arrangements. I must then see to it that the mill-workers have on their best clothes; that the mill is cleaned up and working properly; that the *kyrt* supply is ample; that everyone looks contented and pleased; that the houses have been cleaned and the streets policed; that some dancers are on hand in case the Squires would care to view some amusing native dance; that maybe a few pretty g—"

"Never mind that, Townman," said Junz.

"*You* never mind that. I do."

After his experiences with the Florinians of the Civil Service, Junz found the Townman as refreshing as a drink of cold water. He made up his mind that what influence the I.S.B. could bring to bear would be used to prevent any surrender of the Townman to the Squires.

Terens went on, in calmer tones, "Anyway, that's my part. When they come, I line up with the rest. I don't know who they are. I don't speak to them."

"Was there any such inspection the week before the city doctor was killed? I suppose you know what week that happened."

"I think I heard about it in the newscasts. I don't think there was any Squire's inspection at that time. I can't swear to it."

"Whom does your land belong to?"

Terens pulled the corners of his mouth back. "To the Squire of Fife."

Steen spoke up, breaking into the give-and-take with rather surprising suddenness. "Oh, look here. Really! You're playing into Fife's hands with this kind of questioning, Dr. Junz. Don't you see you won't get anywhere? Really! Do you suppose if Fife were interested in keeping tabs on that creature there that he would go to all the trouble of making trips to Florina to look at him. What are Patrollers for? Really!"

Junz looked flustered. "In a case like this, with a world's economy and maybe its physical safety resting on the contents of one man's mind, it's natural that the psycho prober would not care to leave the guardianship to Patrollers."

Fife intervened. "Even after he had wiped out that mind, to all intents."

Abel pushed out his lower lip and frowned. He saw his latest gamble sliding into Fife's hands with all the rest.

Junz tried again, hesitantly. "Was there any particular Patroller or group of Patrollers that was always underfoot."

"I'd never know. They're just uniforms to me."

Junz turned to Valona with the effect of a sudden pounce. A moment before she had gone a sickly white and her eyes had become wide and stary. Junz had not missed that.

He said, "What about you, girl?"

But she only shook her head, wordlessly.

Abel thought, heavily, *There's nothing more to do. It's all over.*

But Valona was on her feet, trembling. She said, in a husky whisper, "I want to say something."

Junz said, "Go ahead, girl. What is it?"

Valona talked breathlessly and with fright obvious in every line of her countenance and every nervous twitch of her fingers. She said, "I'm just a country girl. Please don't be angry with me. It's just that it seems that things can only be one way. Was my Rik so very important? I mean, the way you said?"

Junz said, gently, "I think he was very, very important. I think he still is."

"Then it must be like you said. Whoever it was who had put him on Florina wouldn't have dared take his eye away for even a minute hardly. Would he? I mean, suppose Rik was beaten by the mill superintendent or was stoned by the children or got sick and died. He wouldn't be left helpless in the fields, would he, where he might die before anyone found him? They wouldn't suppose that it would just be *luck* that would keep him safe." She was speaking with an intense fluency now.

"Go on," said Junz, watching her.

"Because there was one person who did watch Rik from the start. He found him in the fields, fixed it so I would take care of him, kept him out of trouble and knew about him every day. He even knew all about the doctor, because I told him. It was he! It was he!"

With her voice at screaming intensity, her finger pointed rigidly at Myrlyn Terens, Townman.

And this time, even Fife's superhuman calm broke and his arms stiffened on his desk, lifting his massive body a full inch off his seat, as his head swiveled quickly toward the Townman.

XVIII.

It was as though a vocal paralysis had gripped them all. Even Rik, with disbelief in his eyes, could only stare woodenly, first at Valona, then at Terens.

Then came Steen's high-pitched laugh and the silence was broken.

Steen said, "I believe it. Really! I said so all along. I said the native was in Fife's pay. That shows you the kind of man Fife is. He'd pay a native to—"

"That's an infernal lie."

It wasn't Fife who spoke, but the Townman. He was on his feet, eyes glistening with passion.

Abel, who of them all seemed the least moved, said, "What is?"

Terens stared at him a moment, not comprehending, then said, chokingly, "What the Squire said. I am in the pay of no Sarkite."

"And what the girl said? Is that a lie, too?"

Terens wet his dry lips with the tip of his tongue. "No, that's true. I am the psycho prober." He hurried on. "Don't look at me like that, Lona. I didn't mean to hurt him. I didn't intend any of what happened." He sat down again.

Fife said, "This is a sort of device. I don't know exactly what you're planning, Abel, but it's impossible on the face of it that this criminal could have included this particular crime in his repertoire. It's definite that only a Great Squire could have had the necessary knowledge and facilities. Or are you anxious to take your man Steen off the hook by arranging for a false confession?"

Terens, hands tightly clasped, leaned forward in his seat. "I don't take Trantorian money, either."

Fife ignored him.

Junz was the last to come to himself. For minutes, he could not adjust to the fact that the Townman was not really in the same room with him; that he was somewhere else on the Embassy grounds; that he could see him only in image form, no more real actually than was Fife who was twenty miles away. He wanted to go to the Townman, grip him by the shoulder, speak to him alone; but he couldn't. He said, "There's no point in arguing before we hear the man. Let's have the details. If he *is* the psycho prober, we need the details badly. If he isn't, the details he'll try to give us will prove it."

"If you want to know what happened," cried Terens, "I'll tell you. Holding it back won't do me any good any longer. It's Sark or Trantor after all, so to Space with it. This will at least give me a chance to get one or two things into the open."

He pointed at Fife in scorn. "There's a Great Squire. Only a Great Squire, says this Great Squire, can have the knowledge or the facilities to do what the psycho prober did. He believes it, too. But what does he know? What do any of the Sarkites know?

"They don't run the government. Florinians do! The Florinian Civil Service does. They get the papers, they make the papers, they file the papers. And it's the papers that run Sark. Sure, most of us are too beaten even to whimper, but do you know what we could do if we wanted to, even under the noses of our Squires? Well, you see what I've done.

"I was temporarily traffic manager at the spaceport a year ago. Part of my training. It's in the records. You'll have to dig a little to find it because the listed traffic manager is a Sarkite. He had the title but I did the actual work. My name would be found in the special section headed: Native Personnel. No Sarkite would have dirtied his eyes looking there.

"When the local I.S.B. sent the spatioanalyst's message to the port with a suggestion that we meet the

ship with an ambulance, *I* got the message. I passed on what was safe. This matter of the destruction of Florina was not passed on.

"I arranged to meet the spatioanalyst at a small suburban port. I could do that easily. All the wires and strings that ran Sark were at my fingertips. I was in the Civil Service, remember. A Great Squire who wanted to do what I did, couldn't, unless he ordered some Florinian to do it for him. I could do it without anyone's help. So much for knowledge and facility.

"I met the spatioanalyst, kept him away from both Sark and the I.S.B. I squeezed as much information out of him as I could and set about using that information for Florina and against Sark."

Words were forced out of Fife. "You sent those first letters?"

"I sent those first letters, Great Squire," said Terens, calmly. "I thought I could force control of enough of the *kyrt* lands into my own hands to make a deal with Trantor on my terms and drive you off the planet."

"You were mad."

"Maybe. Anyway, it didn't work. I had told the spatioanalyst I was the Squire of Fife. I had to, because he knew that Fife was the biggest man on the planet, and as long as he thought I was Fife, he was willing to talk openly. It made me laugh to realize that he thought Fife was anxious to do whatever was best for Florina.

"Unfortunately, he was more impatient than I was. He insisted that every day lost was a calamity, while I knew that my dealings with Sark needed time more than anything else. I found it difficult to control him and eventually had to use a psycho probe. I could get one. I had seen it used in hospitals. I knew something about it. Unfortunately, not enough.

"I set the probe to wipe out the anxiety from the surface layers of his mind. That's a simple operation. I still don't know what happened. I think the anxiety must have run deeper, very deep, and the probe automatically followed it, digging out most of the conscious mind along with it. I was left with a mindless thing on my hands. I'm sorry, Rik."

Rik, who had been listening intently, said, sadly, "You shouldn't have interfered with me, Townman, but I know how you must have felt."

"Yes," said Terens, "you've lived on the planet. You know about Patrollers and Squires and the difference between Lower City and Upper City."

He took up the current of his story again. "So there I was with the spatioanalyst completely helpless. I couldn't let him be found by anyone who might trace his identity. I couldn't kill him. I felt sure his memory would return and I would still need his knowledge, to say nothing of the fact that killing him would forfeit the good will of Trantor and the I.S.B. which I would eventually need.

Besides, in those days, I was incapable of killing.

"I arranged to be transferred to Florina as Townman and I took the spatioanalyst with me on forged papers. I arranged to have him found; I picked Valona to take care of him. There was no danger thereafter except for that one time with the doctor. Then I had to enter the power plants of Upper City. That was not impossible. The engineers were Sarkite but the janitors were Florinian. On Sark I learned enough about power mechanics to know how to short a power line. It took me three days to find the proper time for it. After that, I could murder easily. I never knew, though, that the doctor kept duplicate records in both halves of his office. I wish I had."

Terens could see Fife's chronometer from where he sat. "Then, one hundred hours ago—it seems like a hundred years—Rik began remembering again. Now you have the whole story."

"No," said Junz, "we have not. What are the details of the spatioanalyst's story of planetary destruction?"

"Do you think I understood the details of what he had to say? It was some sort of . . . pardon me, Rik . . . madness."

"It wasn't," blazed Rik. "It couldn't have been."

"The spatioanalyst had a ship," said Junz. "Where is it?"

"On the scrap heap long ago," said Terens. "An order scrapping it was sent out. My superior signed it. A Sarkite never reads papers, of course. It was scrapped without question."

"And Rik's papers? You said he showed you papers!"

"Surrender that man to us," said Fife, suddenly, "and we'll find out what he knows."

"No," said Junz. "His first crime was against the I.S.B. He kidnaped and damaged the mind of a spatioanalyst. He belongs to us."

Abel said, "Junz is correct."

Terens said, "Now look here. I don't say a word without safeguards. I know where Rik's papers are. They're where no Sarkite or Trantorian will ever find them. If you want them, you'll have to agree that I'm a political refugee. Whatever I did was out of partiotism, out of a regard for the needs of my planet. A Sarkite or a Trantorian may claim to be patriotic; why not a Florinian as well."

"The ambassador," said Junz, "has said you will be given over to the I.S.B. I assure you that you will not be turned over to Sark. For your treatment of the spatioanalyst, you will be tried. I cannot guarantee the result, but if you co-operate with us now, it will count in your favor."

Terens looked searchingly at Junz. Then he said, "I'll take my chance with you, doctor. According to the spatioanalyst, Florina's sun is in the pre-nova stage."

"What!" The exclamation or its

equivalent came from all but Valona.

"It's about to explode and go boom," said Terens, sardonically. "And when that happens all of Florina will go poof, like a mouthful of tobacco smoke."

Abel said, "I'm no spatioanalyst, but I have heard that there is no way of predicting when a star will explode."

"That's true—until now, anyway. Did Rik explain what made him think so?"

"I suppose his papers will show that. All I can remember is about the carbon current."

"What?"

"He kept saying: The carbon current of space; the carbon current of space. That, and the words, catalytic effect. There it is."

Steen giggled. Fife frowned. Junz stared.

Then Junz muttered, "Pardon me. I'll be right back." He stepped out of the limits of the receptor cube and vanished.

He was back in fifteen minutes.

Junz looked about in bewilderment when he returned. Only Abel and Fife were present.

He said, "Where—"

Abel broke in instantly. "We have been waiting for you, Dr. Junz. The spatioanalyst and the girl are on their way to the Embassy. The conference is ended."

"Ended! Great galaxy, we have only begun. I've got to explain the possibilities of nova-formation."

Abel shifted uneasily in his seat. "It is not necessary to do that, doctor."

"It is very necessary. It is essential. Give me five minutes."

"Let him speak," said Fife. He was smiling.

Junz said, "Take it from the beginning. In the earliest recorded scientific writings of galactic civilization it was already known that stars obtained their energy from nuclear transformations in their interiors. It was also known that, given what we know about conditions in stellar interiors, two types, and only two types, of nuclear transformations can possibly yield the necessary energy. Both involve the conversion of hydrogen to helium. The first transformation is direct: two hydrogens and two neutrons combine to form one helium nucleus. The second is indirect, with several steps. It ends up with hydrogen becoming helium, but in the intermediate steps, carbon nuclei take part. These carbon nuclei are not used up but are re-formed as the reactions proceed, so that a trifling amount of carbon can be used over and over again, serving to convert a great deal of hydrogen to helium. The carbon acts as a catalyst, in other words. All this has been known back to the days of prehistory, back to the time when the human race was restricted to a single planet, if there ever was such a time."

"If we all know it," said Fife, "I

would suggest that you are contributing nothing but a waste of time."

"But this is *all* we know. Whether stars use one or the other, or both, nuclear processes has never been determined. There have always been schools of thought in favor of each of the alternatives. Usually, the weight of opinion has been in favor of the direct hydrogen-helium conversion as being the simpler of the two.

"Now Rik's theory must be this. The hydrogen-helium direct conversion is the *normal* source of stellar energy, but under certain conditions, the carbon catalysis adds its weight, hastening the process, speeding it up, heating up the star.

"There are currents in space. You all know that well. Some of these are carbon currents. Stars passing through the currents pick up innumerable atoms. The total mass of atoms attracted, however, is incredibly microscopic in comparison to the star's weight and does not affect it in any way. *Except for carbon!* A star that passes through a current containing unusual concentrations of carbon becomes unstable. I don't know how many years or centuries or millions of years it takes for the carbon atoms to diffuse into the star's interior, but it probably takes a long time. That means that a carbon current must be wide and a star must intersect it at a small angle. In any case, once the quantity of carbon percolating into the star's interior passes a certain critical amount, the star's radiation is suddenly boosted tremendously. The outer layers give way under an unimaginable explosion and you have a nova.

"Do you see?"

Junz waited.

Fife said, "Have you figured all this out in two minutes as a result of some vague phrase the Townman remembered the spatioanalyst to have said a year ago."

"Yes. Yes. There's nothing surprising in that. Spatioanalysis is ready for that theory. If Rik had not come up with it, someone else would have shortly. In fact, similar theories have been advanced before, but they were never taken seriously. They were put forward before the techniques of spatioanalysis were developed and no one was ever able to account for the sudden acquisition of excess carbon by the star in question.

"But now we know there *are* carbon currents. We can plot their courses, find out what stars intersected those courses in the past ten thousand years, check that against our records for nova formation and radiation variations. That's what Rik must have done. Those must have been the calculations and observations he tried to show the Townman. But that's all beside the immediate point.

"What must be arranged for now is the immediate beginning of an evacuation of Florina."

"I thought it would come to that,"

said Fife, composedly.

"I'm sorry, Junz," said Abel, "but that's quite impossible."

"Why impossible?"

"*When* will Florina's sun explode?"

"I don't know. From Rik's anxiety a year ago, I'd say we had little time."

"But you can't set a date?"

"Of course not."

"When will you be able to set a date?"

"There's no way of telling. Even if we get Rik's calculations, it would all have to be rechecked."

"Can you guarantee that the spatio-analyst's theory will prove to be correct?"

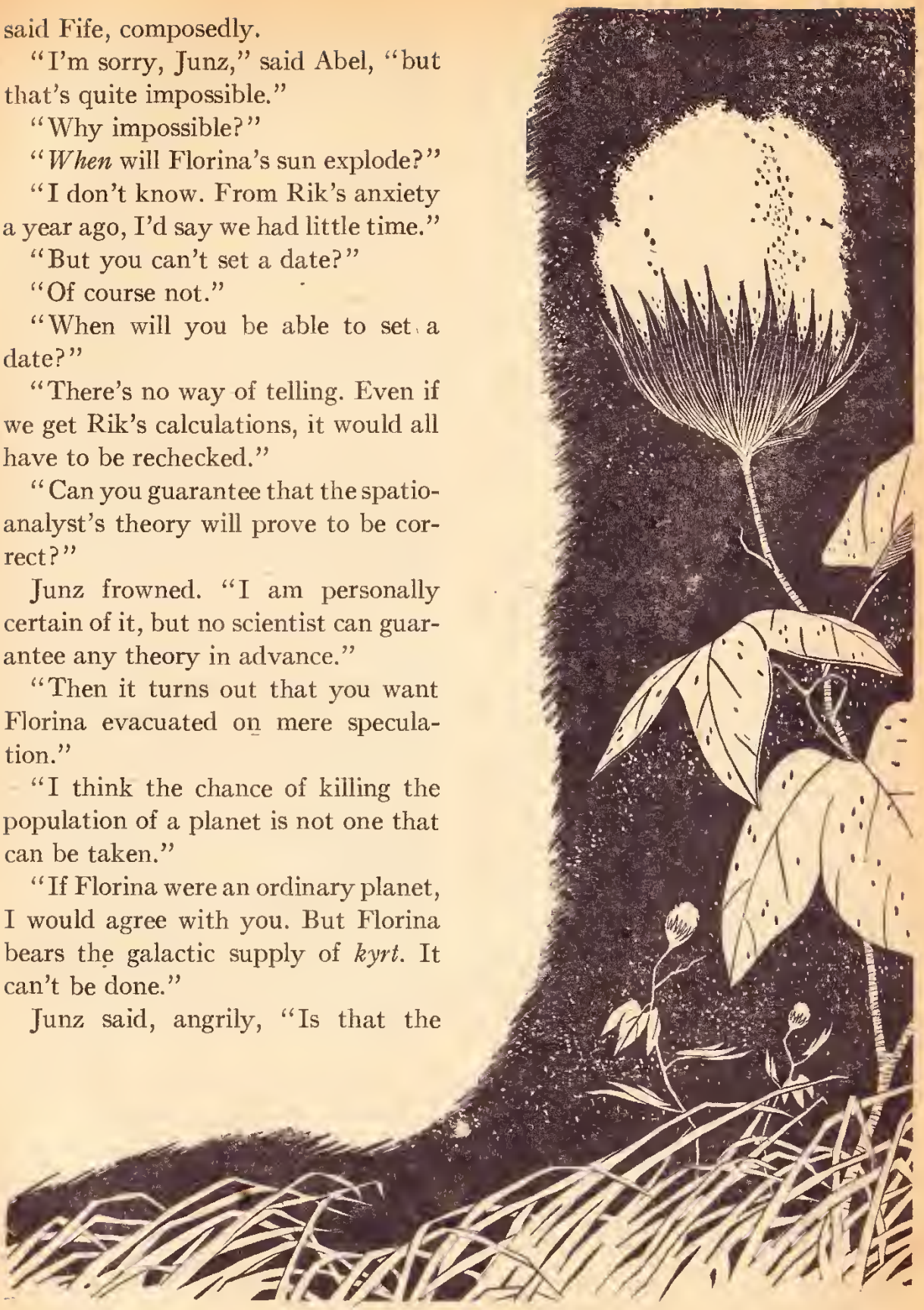
Junz frowned. "I am personally certain of it, but no scientist can guarantee any theory in advance."

"Then it turns out that you want Florina evacuated on mere speculation."

"I think the chance of killing the population of a planet is not one that can be taken."

"If Florina were an ordinary planet, I would agree with you. But Florina bears the galactic supply of *kyrt*. It can't be done."

Junz said, angrily, "Is that the



agreement you came to with Fife while I was gone?"

Fife intervened. He said, "Let me explain, Dr. Junz. The government of Sark would never consent to evacuate Florina, even if the I.S.B. claimed it had proof of this nova theory of yours. Trantor cannot force us because while the galaxy might support a war against Sark for the purpose of maintaining the *kyrt* trade, it will never support one for the purpose of ending it."

"Exactly," said Abel. "I am afraid our own people would not support us in such a war."

Junz found revulsion growing strong within him. A planet-full of people meant nothing against the dictates of economic necessity!

He said, "Listen to me. This is not a matter of one planet, but of a whole galaxy. There are now twenty full novae originating within the galaxy every year. In addition, some two thousand stars among the galaxy's hundred billion shift their radiation characteristics sufficiently to render uninhabitable any habitable planets they may have. Human beings occupy one million stellar systems in the galaxy. That means that on an average of once every fifty years, some inhabited planet somewhere becomes too hot for life. Such cases are a matter of historical record. Every five thousand years, some inhabited planet has a fifty-fifty chance of being puffed to gas by a nova.

"If Trantor does nothing about Florina, if it allows it to vaporize with its people on it, that will serve notice to all the people of the galaxy that when their own turn comes, they may expect no help, if such help is in the way of the economic convenience of a few powerful men. Can you risk that, Abel?

"On the other hand, help Florina and you will have shown that Trantor puts its responsibility to the people of the galaxy above the maintenance of mere property rights. Trantor will win the good will that it could never win by force."

Abel bowed his head. Then he shook it wearily: "No, Junz. What you say appeals to me, but it is not practical. I can't count on emotions as against the assured political effect of any attempt to the end the *kyrt* trade. In fact, I think it would be wise to avoid investigating the theory. The thought that it might be true would do too much harm."

"But what if it *is* true?"

"We must work on the assumption that it is not. I take it that when you were gone a few moments ago, it was to contact the I.S.B."

"Yes."

"No matter. Trantor, I think, will have enough influence to stop their investigations."

"I'm afraid not. Not these investigations. Gentlemen, we will soon have the secret of cheap *kyrt*. There will be no *kyrt* monopoly within a year,

whether or not there is a nova."

"What do you mean?"

"The conference is reaching the essential point now, Fife. *Kyrt* grows only on Florina of all inhabited planets. Its seeds produce ordinary cellulose elsewhere. Florina is probably the only inhabited planet, on a chance basis, that is currently pre-nova, and it has probably been pre-nova since it first entered the carbon current, perhaps thousands of years ago, if the angle of intersection was small. It seems quite probable, then, that *kyrt* and the pre-nova stage go together."

"Nonsense," said Fife.

"Is it? There must be a reason why *kyrt* is *kyrt* on Florina and cotton elsewhere. Scientists have tried many ways of artificially producing *kyrt* elsewhere, but they tried blindly, so they've always failed. Now they will know it is due to factors induced in a pre-nova stellar system."

Fife said, scornfully, "They've tried duplicating the radiation qualities of Fife's sun."

"With appropriate arc lights, yes, that duplicated the visible and ultraviolet spectrum only. What about radiation in the infrared and beyond? What about magnetic fields? What about electron emission? What about cosmic ray effects? I'm not a physical biochemist so there may be factors I know nothing about. But people who are physical biochemists will be looking now, a whole galaxy of them. Within the year, I assure you, the so-

lution will be found.

"Economics is on the side of humanity now. The galaxy wants cheap *kyrt*, and if they find it or even if they imagine they will shortly find it, they will want Florina evacuated, not only out of humanity, but out of a desire to turn the tables, at long last, on the *kyrt*-gouging Sarkites."

"Bluff!" growled Fife.

"Do you think so, Abel?" demanded Junz. "If you help the Squires, Trantor will be looked on not as the saviors of the *kyrt* trade, but of the *kyrt* monopoly. Can you chance that?"

"Can Trantor chance a war?" demanded Fife.

"War? Nonsense! Squire, in one year your holdings on Florina will be worthless, nova or not. Sell out. Sell out all Florina. Trantor can pay for it."

"Buy a planet?" said Abel in dismay.

"Why not? Trantor has the funds, and its gain in good will among the people of the universe will pay it back a thousandfold. If telling them that you are saving hundreds of millions of lives is not enough, tell them that you will bring them cheap *kyrt*. That will do it."

"I'll think about it," said Abel.

Abel looked at the Squire. Fife's eyes fell.

After a long pause, he, too, said, "I'll think about it."

Junz laughed harshly. "Don't think too long. The *kyrt* story will break quickly enough. Nothing can stop it. After that, neither one of you will have freedom of action. You can each strike a better bargain now."

The Townman seemed beaten. "It's really true?" he kept repeating. "Really true? No more Florina."

"It's true," said Junz.

Terens spread his arms, let them fall against his side. "If you want the papers I got from Rik, they're filed among vital statistic files in my home town. I picked the dead files, records a century back and more. No one would ever look there for any reason."

"Look," said Junz, "I'm sure we can make an agreement with the I.S.B. We'll need a man on Florina, one who knows the Florinian people, who can tell us how to explain the facts to them, how to best organize the evacuation, how to pick the most suitable planets of refuge. Will you help us?"

"And beat the game that way, you mean? Get away with murder? Why not?" There were sudden tears in the Townman's eyes. "But I lose anyway. I will have no world, no home. We all lose. The Florinians lose their world; the Sarkites lose their wealth; the Trantorians their chance to get that wealth. There are no winners at all."

"Unless," said Junz, gently, "you realize that in the new galaxy,—a galaxy safe from the threat of stellar instability, a galaxy with *kyrt* available to all, and a galaxy in which politi-

cal unification will be so much closer—there will be winners after all. One quadrillion winners. The people of the galaxy; *they* are the victors."

EPILOGUE

"Rik! Rik!" Selim Junz hurried across the port grounds toward the ship, hands outstretched. "And Lona! I'd never have recognized either of you. How are you? How are you?"

"As well as we could wish. Our letter reached you, I see," said Rik.

"Of course. Tell me, what do you think of it all?" They were walking back together, toward Junz's offices.

Valona said sadly, "We visited our old town this morning. The fields are so empty." Her clothing was now that of a woman of the Empire, rather than that of a peasant of Florina.

"Yes, it must be dreary for a person who has lived here. It grows dreary even for me, but I will stay as long as I can. The radiation recordings of Florina's sun are of tremendous theoretical interest."

"So much evacuation in less than a year! It speaks for excellent organization."

"We're doing our best, Rik. Oh, I think I should be calling you by your real name."

"Please don't. I'll never get used to it. I'm Rik. That's still the only name I remember."

Junz said, "Have you decided whether you're going to return to spatioanalysis?"

Rik shook his head. "I've decided, but the decision is, no. I'll never remember enough. That part's gone forever. It doesn't bother me, though. I'll be returning to Earth. By the way, I rather hoped I'd see the Townman."

"I think not. He decided to go off today. I think he'd rather not see you. He feels guilty, I think. You have no grudge against him?"

Rik said, "No. He meant well, and he changed my life in many ways for the better. For one thing, I met Lona." His arm went about her shoulder.

Valona looked at him and smiled.

"Besides," Rik went on, "he cured me of something. I've found out why I was a spatioanalyst. I know why nearly a third of all spatioanalysts are recruited from the one planet, Earth. Anyone living on a radioactive world is bound to grow up in fear and insecurity. A misstep can mean death and our planet's own surface is the greatest enemy we have.

"That makes for a sort of anxiety bred into us, Dr. Junz; a fear of planets. We're only happy in space; that's the only place we can feel safe."

"And you don't feel that way any longer, Rik."

"I certainly don't. I don't even remember feeling that way. That's it, you see. The Townman had set his psycho probe to remove feelings of anxiety and he hadn't bothered to set the intensity controls. He thought he had a recent, superficial trouble to deal with. Instead there was this deep, ingrained anxiety he knew nothing of. He got rid of all of it. In a sense, it was worth getting rid of it even though so much else went with it. I don't have to stay in space now. I can go back to Earth. I can work there and Earth needs men. It always will."

"You know," Junz said, "why can't we do for Earth what we're doing for Florina? There's no need to bring up Earthmen in such fear and insecurity. The galaxy is big."

"No," said Rik, vehemently. "It's a different case. Earth has its past, Dr. Junz. Many people may not believe it, but we of Earth know that Earth was the original planet of the human race."

"Well, perhaps. I can't say, one way

or the other."

"It *was*. It's a planet that can't be abandoned; it *mustn't* be abandoned. Some day we'll change it; change its surface back to what it once must have been. Till then—we're staying."

Valona said, softly, "And I'm an Earthwoman now."

Rik was looking out at the horizon. Upper City was as garish as ever, but the people were gone.

He said, "How many are left on Florina?"

"About twenty million," said Junz. "We work slower as we go along. We have to keep our withdrawals balanced. The people that are left must always maintain themselves as an economic unit in the months that are left. Of course, resettlement is in its earliest stages. Most of the evacuees are still in temporary camps on neighboring worlds. There is unavoidable hardship."

"When will the last person leave?"

"Never, really."

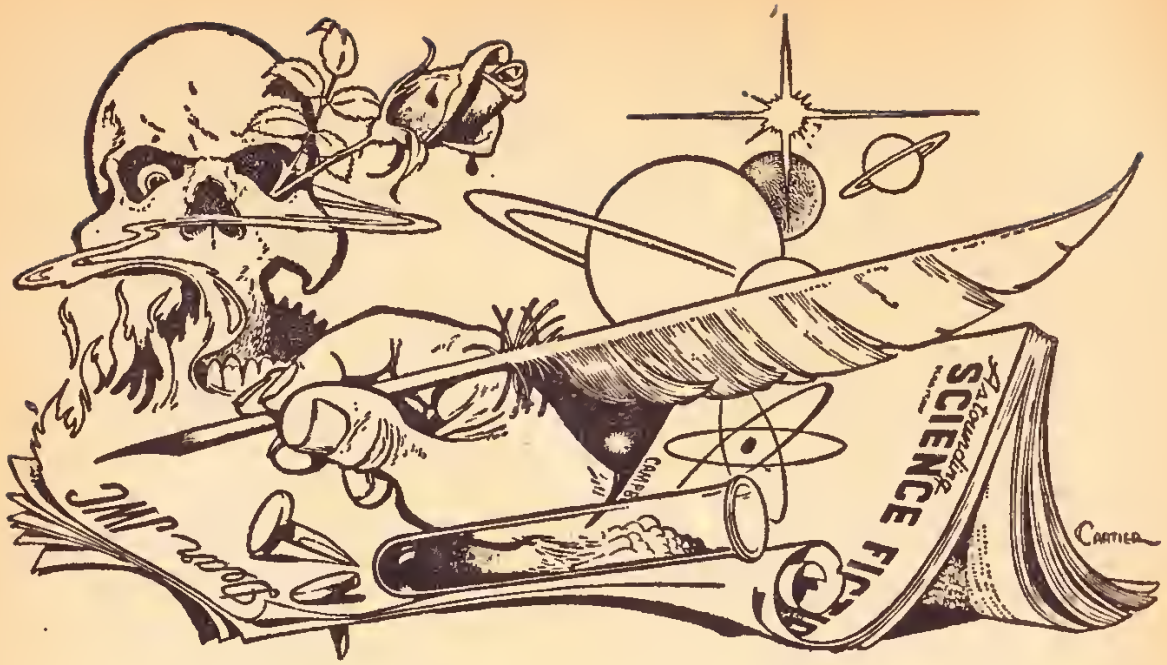
"I don't understand."

"The Townman has applied unofficially for permission to remain. It's been granted, also unofficially. It won't be a matter of public record."

"Remain?" Rik was shocked. "But for the sake of all the galaxy, why?"

"I didn't know," said Junz, "but I think you've explained it when you talked of Earth. He feels as you do. He says he can't bear the thought of leaving Florina to die alone."

THE END



BRASS TACKS

Dear Mr. Campbell:

The occasional letters on the history of science fiction, published in your magazine, have led me to realize that I have in fact been a reader of this form of *belle lettres* back well before 1920. Indeed, some of my favorite titles have been omitted from these discussions. For example, Mark Twain's "A Connecticut Yankee in King Arthur's Court" (1889) is not mentioned even in L. O. Bailey's "Pilgrims through time and space" (1947), although its basic theme—the impact of modern mechanical science and methodology on a primitive society—foreshadows many recent stories, including even the story "Stardust" in your July issue. The method of time travel Clemens uses is, of course, merely the old dream trick; but with all due respect, this differs from the "faster than light drive" gimmick only in being frankly a device.

Another neglected classic is J. A. Mitchell's "Drowsy" (1917—he was then editor of the penultimate instar of *Life* magazine). The antigravity unit that is used to visit the moon, among other places, is not rooted in any particular scientific concept, but the psychology of the inventor is con-

vincing, and the description of his telepathic gift is startlingly realistic, to those who suspect the existence of these experiences. The preface to this book could well be taken as a charter for Science Fiction. I would quote it *in toto*, but would prefer to whet your curiosity by giving the last lines: "So, if this story of Drowsy seems a fairy tale, let us remember that the Atlantic cable would be a fairy tale to Columbus."

On the border of fantasy, though it has an elaborate apparatus of scientific jargon, is Algernon Blackwood's "The Centaur" (1911); a rather confused jumble of Greek mythology, supposed to have had an experiential basis; the idea of a super-race of humanoids; and a sort of pagan nature worship. The genre of this book, with Kipling's "The Children of the Zodiac" from Many Inventions (1891) leads directly to the pure fantasy of Norman Douglas' "In the Beginning" (1928), a slightly bawdy story of an imaginary race—patterned on the gods of Greek Mythology, if these can be imagined to have a modern *weltanschauung*. This in turn is akin to George Meredith's allegory of an Arabian Nights Entertainment world, "The Shaving of Shagpat" (1898).

But to bring in these fables or allegories, because they have a utopian or other-world setting, can lead only to the thought that all science fiction, and fantasy, even including the mathematician Dodgson's "Alice in Wonderland" (1865) and "Through the Looking Glass" (1871)—though I recognize that some refuse to admit that mathematics is a science—are offshoots from the main branch of science fiction. All have their roots in Gulliver's "Travels into Several Remote Nations of the World" (1727), for is not Dean Swift's "Voyage to

Laputa, Balnibarbi, Luggnagg, Glubbdubdrib, and Japan" recognized as authentic science fiction, and is not "A Voyage to the Houynhnms" a good "humanoid" story? One is even tempted to suggest that Puck—"Midsummer-Night's Dream," circ. 1596—who, forsooth would "put a girdle round about the earth in forty minutes," or better than ten miles per second, is the true progenitor of the space opera.—Stowell Rounds, Cannondale, Connecticut.

And, of course, Aesop—date I don't know—is not to be omitted from the roster!

Dear Mr. Campbell:

In your stimulating editorial, "HOW DO *YOU* THINK" you request readers to offer suggestions for the Brass Tacks Department.

For purposes of this discussion, let the fictional part of the magazine represent the dream-imaginative portion of our thinking which goes on in the less conscious part of our thinking apparatus in more or less unapprehended form. Sir Henry Head places the feeling-imaginative functions predominantly in that portion of the brain which may be roughly called the thalamus. The analytical, consciously computing activity is assumed to be carried on predominantly in the cerebral cortex. This idea has been exposed at length in a book, "The Neural Basis of Thought," by G. G. Campion and G. Elliot Smith. In Astounding Science Fiction, the fictional imaginative stuff may be classified as predominantly thalamic. The cortical exercise is provided by the articles, the editorials, and by the transition between the two, Brass Tacks.

In the February issue, there is an article by Crispin Kim-Bradley, "Symbolic Logic and Metamathematics," distinctly cortical in nature. On page 95 he mentions George Boole and his famous *Laws of Thought*. Kim-Bradley says that Boole "actually reduced reasoning to a kind of calculation—but not all reasoning. Beyond a certain level a method is still lacking." The author is correct as far as he goes, but for the information of those of your readers who might be interested, I venture to suggest that he might have gone a little further.

We might say that the "Occidental" side of Boole (action) is stressed and the "Oriental" side (introspection), ignored. Mrs. Mary Boole provided that thalamic side after the death of her husband. Jevons said that "Boole means something that no one has understood yet; the world is not yet ready to understand him." Mary Everest Boole appears to have tried to translate George Boole's metaphysics to the world. His mathematical symbols were successfully translated back into word symbols by Père Gratry. Gratry's "Logique" was

translated by Dr. Milton Singer of the University of Chicago. Mrs. Dummer, in her book "Why I Think So," comments on Mary Boole's comments on Gratry.

In the limited space at the disposal of Brass Tackers, we may get a rough summary by quoting a passage from Mary Boole:

"This secret for inducing inspirations of new knowledge is embodied in Boole's Thought-Equation,

$$X + (\text{not} - X) = 1$$

where 1 stands for the Unit of Thought for the time being. . . . Père Gratry, the Oratorian, formulated the truth which it expresses in language on which George Boole felt he could not improve. Gratry made the law of reunion after tension on contrast the basis of a method of procuring suggestions and revelations; a method as systematic and regular, and as scientific as any invention used by electricians for inducing currents. . . ." (Many years before Freud and modern psychotherapy, Mary Boole added that) "whatever comes to the conscious from the cellar of the mind must be verified by the conscious mind, for imagination taken as hypothesis may be of great value, taken as fact may lead to insanity."

Briefly, the operation of thinking is held to proceed as follows:

The Thalamus begins the process.

1. It indulges in creative reverie.
2. The product of this reverie is exteriorized in the form of an idea.

At this point the Cortex takes over.

3. Using examination, computation, or analysis, it ascertains the opposite or contrary of this idea.
4. It sets up a calibrated scale between the idea and its opposite.
5. By evaluation it determines the

ideal point on this scale, the relative position that is, which makes for optimum efficacy in the expression or implementation of the idea in question.

Readers who are interested in experiments in practicing creative thinking may find instructions for use of the method in Gratry's "Logique," or in Mary Boole's "Collected Works."—Hilaire Hiler, President, Fremont College, Santa Fe, New Mexico.

It's so much easier to define what a hand does that it's no great wonder mechanical-level evolution progressed so much faster than has the mind-level evolution. But until we can define "creative" with respect to the mental level . . . we have trouble thinking about it!

Dear John:

Much intrigued by the article on comets by Willy Ley in the July issue. On reading Ley's note on Halley's Comet, as depicted in the Bayeaux Tapestry, I immediately got out a copy of the *Anglo-Saxon Chronicle*—always keep one around the house for light reading—and noted the entry for the year 1066 beginning as follows:

"In this year King Harold came from York to Westminster . . . Then was, over all England such a token seen in the heavens as no man ever before saw. Some men said that it was cometa the star, which some men call the haired star; and it appeared first on the eve Litania Major, the 8th before the Kalends of May, and so shone all the seven nights."

The Chronicle didn't mention Halley's again on any of the dates listed by Ley in his article. Comets were frequently seen in those dim, dark days, though, on other dates, along with plenty of other fearsome sights. In 773, a fiery crucifix appeared in the heavens after sunset; in 793 "dire forewarnings came over the lands of the Northumbrians" and fiery dragons were seen flying in the air; in 806 a cross appeared "in the moon on a Wednesday at dawn;" in 1106, a strange star appeared in the southwest, "small and dim, but the light that stood from it was very bright, and like an exceedingly long beam shining to the northeast; and one evening it seemed as if a beam from over against the star darted directly into it." That same year, we have the rather unusual report of two moons in the sky "before day," the one in the east and the other in the west, both full! Shades of Charles Fort!—John M. Patrick, First Lieutenant, U. S. Marine Corps, 2621 Burgundy Road, Alexandria, Virginia.

If memory serves, there was one of the rare local-galaxy super-novas in 1106. But there is a bit of a problem; is it scientifically acceptable to consider the evidence of the chronicles re Halley's Comet, where it fits our own ideas, and yet call them "unreliable" with respect to those other phenomena?

Or is it more honest to just consider them useless as data sources?

Dear Mr. Campbell:

Concerning a question that has caused much controversy in Brass Tacks and elsewhere: Should the physical scientists be blamed for much of the current world crisis—for making the horror of atomic war possible?

This brings to mind another pertinent question. If, for fear of the consequences, our much-maligned scientists had refused to do the nuclear research necessary to produce an atomic bomb, would they be hailed today as Noble Saviors of the Race? Or might they stand accused by a majority of people as the black traitors who refused to bring forth the needed superweapon and helped the enemy to gain superiority?

It has been pointed out and is, I believe, quite apparent that the majority of the populace—the "common people"—must accept most of the responsibility for war. Whether stone axes or atomic bombs are used, war is waged because a group, as a group, computes war as the solution to its tangled and clashing social conflicts with another group.

If the sociologists, psychologists, et cetera do have any workable answers to the problems of world peace and unity—as, say a super social catalyst for vaporizing Iron Curtains —they had better come forth with them and soon. With an H Bomb in the offing, they may not get another chance!—Hal J. Martin, 745 Chapman Street, San Jose, California.

Maybe a tip from the biochemist rather than the physicist is needed; instead of violent vaporizing of the Iron Curtain, perhaps we need some sort of digestive enzyme!

Continued from page 6

cube of the pure material — After all, it's just a more complex case of the 0.1 gram sample, isn't it . . . ?

There are a lot of instances in the observed phenomena of science wherein there are critical mass effects, or critical complex effects. Every one of them is an instance of an increasing complexity of *interactions*.

Increase of intelligence appears to be a function of increasing complexity of interactions—of increasing ability to interact data. We might at least hold the attitude that there is a possibility that increase in degree here might well lead to a change in type of reaction—to a critical change of phase, so to speak, causing a reaction-type B, which is, in lower levels of complexity relatively unimportant, to acquire a level of importance such that it overshadows the previously dominant reaction-type A.

Something, certainly, has happened that sets man apart from other animals. Most animal species, for instance, use tools of one sort or another. The beaver builds dams, by using the very effective tools of his chisel-teeth and his mason's-trowel tail. The lion uses the highly efficient tools of his trade—daggers in his jaws and knives in his feet, as well as the bludgeon in his forepaw. He's developed tools for the butcher's trade.

Man, on the other hand, has done the same things in a different way; instead of developing the tools as part of his own structure and being, he has developed the tools all right—but as part of his detachable environment.

He started building these detachable tools to reproduce the effects of the mechanical tools of the lion, the beaver, and other animals. The peripheral tools, one might call them. The mole has digging tools; Man invented shovels.

Then Man invented detachable muscles—steam power and later electric power. He's duplicating and exaggerating some body-function there, too. Man has as detachable parts of his total being muscles stronger than a thousand elephants.

Man's latest trick is developing detachable nervous systems. The cybernetic gadgetry is simply an external and detachable nervous reflex system. As of now, he's succeeded in getting interrelated units that have peripheral action tools powered by electric muscles, and operating under the control of electronic nervous systems.

I don't know whether you can quite name the phenomenon, but it does seem to me that some sort of critical-mass effect of intelligence has been encountered—that Man can *not* properly be classed as "different in degree but not in kind." Man's at least showing the unique characteristic of building detachable extensions of his being as his *normal* way of life, whereas such methods are exceptional indeed in any other organism.

THE EDITOR.

2nd Lt. Joseph C. Rodriguez

U.S. Army

Medal of Honor

FROM ATOP THE HILL, near Munye-ri, Korea, the enemy suddenly opened up a barrage. The squad was trapped. Lieutenant Rodriguez (then Pfc., with only seven months service) broke loose and dashed up the fire-swept slope, throwing grenades. He wiped out three foxholes and two gun positions. Alone, he accounted for 15 enemy dead, led the rout of the enemy, and saved the lives of his squad.

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